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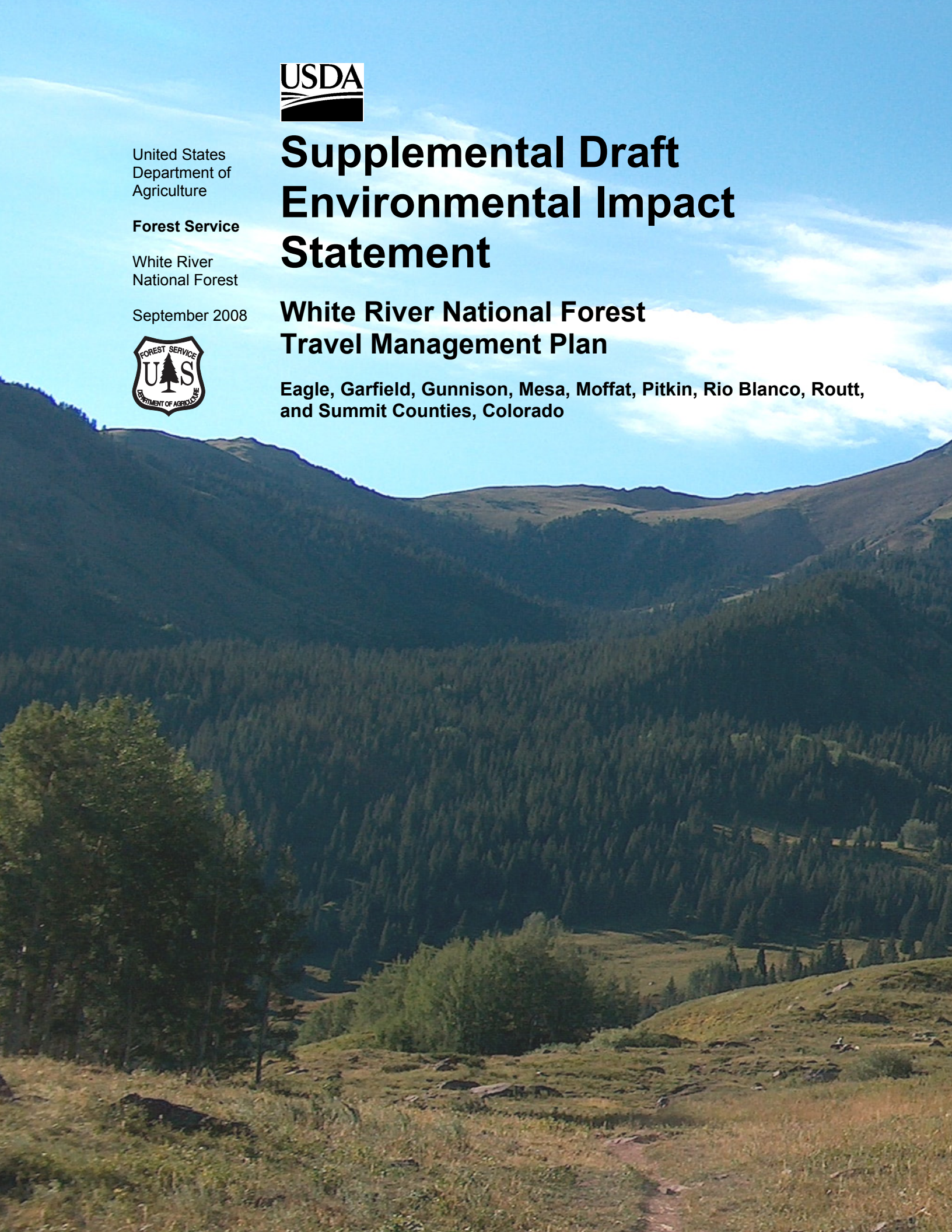
White River
National Forest

September 2008

Supplemental Draft Environmental Impact Statement

White River National Forest Travel Management Plan

Eagle, Garfield, Gunnison, Mesa, Moffat, Pitkin, Rio Blanco, Routt, and Summit Counties, Colorado



Mission

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White River National Forest
Travel Management Plan
Supplemental Draft Environmental Impact Statement

Eagle, Garfield, Gunnison, Mesa, Moffat, Pitkin, Rio Blanco, Routt, Summit Counties

Colorado

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Abstract: The action proposed by the U.S. Department of Agriculture (USDA), Forest Service, in this document, is to present a comprehensive travel management plan for the White River National Forest. The travel management plan and supporting environmental impact statement (EIS) present ways to accommodate and balance the transportation needs of the public and provide adequate access for forest and resource management, while still allowing for protection of natural resources.

Reviewers should provide the Forest Service with their written comments during the review period of the draft EIS. This will enable the Forest Service to analyze and respond to the comments at one time and to use the information acquired in the preparation of the final EIS, thus avoiding undue delay in the decision-making process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions (Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 553 [1978]). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final EIS (City of Angoon v. Hodel [9th Circuit, l986] and Wisconsin Heritages, Inc. v. Harris, 490 F. Supp. 1334, 1338 [E.D. Wis. 1980]). Comments on the draft EIS should be specific and should address the adequacy of the EIS and the merits of the alternatives discussed (40 CFR 1503.3).

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Project FX number: **1-801-397-1605**

Date comments must be received: **60 days from the publication of Notice of Availability in the Federal Register**

White River
National Forest

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SUMMARY

This travel management plan (TMP) and supporting environmental impact statement (EIS) will develop a travel system across the entire White River National Forest to accommodate and balance the transportation needs of the public and to provide adequate access for forest and resource management, while still allowing for protection of natural resources.

The purpose of this initiative is to identify the transportation system with the goal of balancing the physical, biological, and social values of the forest. It responds to several needs noted below.

This action is needed to address the concerns noted below:

- Identify an official designated travel system on the White River National Forest;
- Identify what is not on the official designated travel system on the White River National Forest and be able to restore lands back to their natural state; and
- Designate a travel system that is aligned with the Forest Service mission, including the need to manage the land by providing a system that attempts to balance social and resource demands.

The objectives of the travel management plan are to:

- Bring summer and winter transportation systems into compliance with laws, regulations, agency or national direction, and the forest plan;
- Designate the forest road and trail system and eliminate through rehabilitation those that are not part of the system;
- Provide a travel plan that defines modes of travel across the forest by area and by route; and
- Identify resource solutions to impacts due to the transportation system, including routes identified for decommissioning.

This effort is an extension of earlier work to update travel management along with the forest plan. The draft forest plan, released for public comment in August 1999, contained a detailed travel management plan. Planners decided to separate the two decisions based on public comment about the difficulty in reviewing both the travel management plan and forest plan decisions simultaneously and the desire for more time to review travel management. Planning information from the initial effort, including site-specific comments received during the comment period on the draft forest plan, was brought forward for consideration in this travel management plan.

The Notice of Intent (NOI) for the travel management plan was published in the *Federal Register* on August 27, 2002. The NOI asked for public comment on the proposal from August 27, 2002 to October 31, 2002.

The White River National Forest prepared and released for comment a draft environmental impact statement (DEIS) with alternatives for the proposed Travel Management Plan in June 2006 for a 90-day comment period. Since that time comments were received and read, and responses prepared. Although the DEIS did incorporate the Travel Management: Designated Routes and Areas for Motor Vehicle Use (travel rule),

clarification on implementation of the travel rule has now been more formalized both nationally and regionally.

Based on the original DEIS range of alternatives, the ability to further incorporate the travel rule, and all the public comments received, the White River National Forest developed a preferred alternative for the Travel Management Plan. The decision-maker felt it was important to present the preferred alternative in a supplemental DEIS (SDEIS) for a 60-day public comment period.

Key issues still remain as:

- Volume and type of recreation access;
- Resolution of recreation conflict; and
- Protection of natural resources.

These issues led the agency to develop alternatives to meet the purpose and need. Alternatives for the travel management plan are based on thematic applications of issues generated by public comment.

The preferred alternative in the SDEIS – Alternative G, is a reflection of a blend of the previously presented alternatives, public comment, and management implication due to the travel rule.

The SDEIS also contains an alternative called minimal action required to be compliant with laws, regulations and the White River National Forest Land and Resource Management Plan, 2002 Revision, as amended (forest plan). This is now Alternative F; in the previous DEIS this was Alternative B. This alternative has incorporated corrections to the baseline system that were presented by internal and external parties.

The no action alternative, Alternative A, represents current conditions. Although this alternative would not meet the purpose and need or forest plan direction, it is being presented as the required no action alternative to provide a basis for comparison of the effects of the action alternatives.

In order to accurately reflect the changes due to the travel rule and respond to the comments that requested simplification, the document, purpose and need, and legend for both summer and winter uses was revised and simplified. Though the reader will see these types of changes from the DEIS to the SDEIS, the supplement reflects the ideas, concepts, and alternatives presented in the DEIS. The SDEIS is a continuation of the NEPA process to achieve the final Travel Management Plan.

Decisions to be made:

1) Designation of the summer road and trail system:
   a) Defining the designated forest roads and trails;
   b) Defining what modes of travel are accepted on each road and trail;
   c) Deciding whether to incorporate or rehabilitate user-created routes; and
   d) Determining if certain forest routes are no longer needed as part of the system and identifying those for decommissioning.
2) Designation of winter uses:
   a) Designating open areas and routes for motorized use by vehicles made for over-snow travel.

Based on an examination of the decision criteria, current direction, and future projections, Alternative G is identified as the preferred alternative, however the forest will consider all aspects in part or in whole of the other alternatives when formulating the final decision.

The alternative identified as the preferred is draft in nature and does not indicate a final decision. The final decision may result in the selection of any of the alternatives, a combination of alternatives, and/or from additional information and comments received between the draft environmental impact statement and the final decision.

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

Introduction

The Forest Service has prepared this supplemental draft environmental impact statement (SDEIS) as a continuation of the travel management plan process. The White River National Forest has employed the National Environmental Policy Act (NEPA) process to establish the travel management system and uses on that system on White River National Forest System lands.

Reason for the SDEIS

The White River National Forest prepared and released for comment a draft environmental impact statement (DEIS) with alternatives for the proposed Travel Management Plan in June. Since that time comments were received and read, and responses prepared. Although the DEIS did incorporate the Travel Management: Designated Routes and Areas for Motor Vehicle Use (travel rule), clarification on implementation of the travel rule has now been more formalized both nationally and regionally.

Based on the original DEIS range of alternatives, the ability to further incorporate the travel rule, and all the public comments received, the White River National Forest developed a preferred alternative for the Travel Management Plan. The decision-maker felt it was important to present the preferred alternative in a SDEIS for public comment.

The preferred alternative in the SDEIS – Alternative G, is a reflection of a blend of the previously presented alternatives, public comment, and management implication due to the travel rule.

The SDEIS also contains an alternative called minimal action required to be compliant with laws, regulations and the White River National Forest Land and Resource Management Plan, 2002 Revision, as amended (forest plan). This is now Alternative F; in the previous DEIS this was Alternative B. This alternative has incorporated corrections to the baseline system that were presented by internal and external parties.

The no action alternative, Alternative A, represents current conditions. Though this alternative would not meet current regulations or forest plan direction, it is being presented as the required no action alternative to provide a basis for comparison of the effects of the action alternatives.

In order to accurately reflect the changes due to the travel rule and respond to the comments that requested simplification, the document, purpose and need, and legend for both summer and winter uses was revised and simplified. Though the reader will see these types of changes from the DEIS to the SDEIS, the supplement reflects the ideas, concepts, and alternatives presented in the DEIS. The SDEIS is a continuation of the NEPA process to achieve the final Travel Management Plan.

This SDEIS has been prepared as required by the National Environmental Policy Act, the Council on Environmental Quality regulations for implementing NEPA provisions (40 CFR 1500), The National Forest Management Act (NFMA), as well as applicable Forest Service manuals, handbooks and other higher-level direction.

Background

Location

The White River National Forest is located in the west central part of Colorado and ranges in elevation from 5,000 feet to more than 14,000 feet, with most of its lands lying between 8,500 and 11,800 feet. There are approximately 2,482,000 acres within the current forest boundary; and approximately 198,300 of those acres are of other ownership.

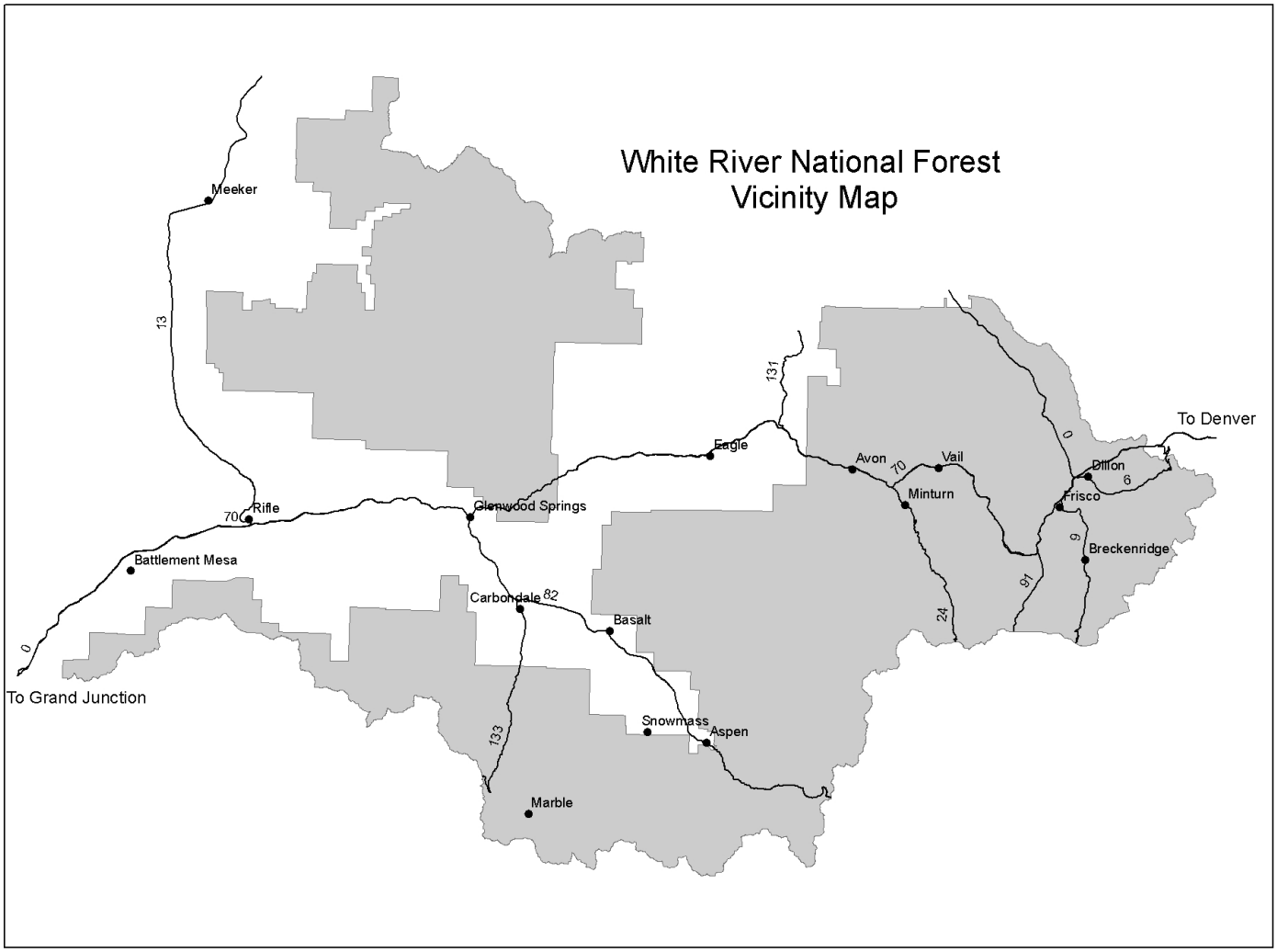


Figure 1.1—Location of White River National Forest

The White River National Forest resides in nine counties with the majority in Eagle, Garfield, Pitkin, and Summit counties and small parcels in Gunnison, Mesa, Moffat, Rio Blanco, and Routt counties. The forest is administratively divided into five ranger districts: Aspen/ Sopris, Blanco, Dillon, Eagle/ Holy Cross, and Rifle.

History

The transportation system on and around the forest has evolved over time. From as early as 10,000 B.C.E., Paleo-Indians moved through the region seasonally following big game and the trails they created. The Ute Nation occupied the area for several centuries. The Utes were skillful nomadic hunters who followed herds of bison and elk on their seasonal migrations. They developed an extensive network of foot and horse trails throughout the region. Fur traders traveled through the area in the 1820s, trapping beavers and establishing trading posts in the area. Roads and trails were developed to access these posts and grew with the mining boom of the 1870s. Roads and trails were also created to access timber needed to support the mines and new towns. Railroads soon followed, along with ranching and farming, to provide for the growing population. Roads, trails, and rail lines were created to access the mines and timber, and to move livestock. Historic roads and trails were built as needed without much forethought into planning for future access and maintenance needs or environmental protection.

As resource extraction continued, conservation measures became necessary to protect future uses of these natural resources. President Benjamin Harrison signed a proclamation on October 16, 1891 establishing the White River Plateau Timberland Reserve, encompassing 1,198,180 acres. Additional lands were added over time, including the Battlement Reserve and the Holy Cross National Forest, to form today's White River National Forest. At first the land was managed primarily for livestock grazing and timber production. Conflict resolution, conservation of use, and land protection were the early rangers' primary responsibilities. Trails and roads were created as needed to accommodate any immediate transportation needs. With the Great Depression came the establishment of the Civilian Conservation Corps (CCC). From 1933 to 1942 the CCC built roads, trails, recreation facilities, and buildings. These were perhaps the first engineered facilities on the forest, and the works enhanced user recreation opportunities.

During World War II, Camp Hale was established to train soldiers in winter mountaineering techniques. Some of these men later returned to create resort alpine skiing in the area. During this time period (1937-1951) outbreaks of mountain pine beetle and spruce beetle attacked thousands of acres of forest. This led to an increase in timber production in an attempt stop the spread of the beetles. With this increase in timber harvesting came more roads, generally native surface roads with limited engineering. Recreation use increased on the forest after the war, and in 1951 the White River National Forest began to receive new budget allotments for clean-up, maintenance, and restoration of the forest's campgrounds and hiking trails. The Flat Tops Primitive Area was established in the 1950s and later was designated as wilderness. Alpine ski resorts were developed on the forest in the 1960s, which brought more people to the area. Highways were improved to meet access needs to these newly established resort towns. The Wilderness Act was passed in 1964, and between 1964 and 1993 eight wilderness areas were designated on the White River National Forest. Any roads that had been developed in these areas were either closed or converted to trails to meet the management objectives for wilderness areas.

The Forest Service developed road design standards and construction practices in the early 1950s with an emphasis on direct alignments with specific road grades and curves. Although economic considerations were, and continue to be, a major driving force in road construction, the impacts of such design standards were recognized in the 1970s, when road alignments and grades were designed to follow topographic contours in order to minimize ground disturbance and other impacts.

Timber production on the White River National Forest increased from 1984 to 1997, mostly as a result of the demand for beetle-killed timber. This led to the planning and construction of engineered transportation system roads to access the acres that required treatment. The Forest Service established road standards in 1985 to minimize resource impacts from roads and provide guidance over route location, construction, operation, and maintenance. The forest continues to incorporate more advanced techniques for water and erosion control to preserve water quality and watershed health.

Today the emphasis is to minimize additional road construction, and, instead, to reconstruct, maintain, or decommission roads in the transportation system.

For recreation, the future emphasis will be to design and utilize trails and networks that meet the needs of users while protecting the natural resources. This new emphasis requires designing systems for that use, not necessarily accepting systems designed from the past. This also means providing networks in certain particular areas that are best suited for the intended use.

Travel Management

Travel management is the integrated planning of, and providing for, movement of people and products to and through National Forest System lands. A travel management plan provides clear, specific direction on the appropriate levels of land, water, and air access opportunities to be made available.

Travel is an important part of virtually every activity that occurs on the forest. Motorized modes of travel on the forest include large commercial trucks, automobiles, high clearance vehicles, four-wheel-drive vehicles, all-terrain vehicles (ATVs), motorcycles, snowcats, snowmobiles, and bicycles with motors. Non-motorized modes of travel include cross-country skiing, downhill skiing and snowboarding, dog sledding, snowshoeing, horseback riding, pack animal driving, hiking, and bicycling (including mountain biking). Boating can be motorized with gas driven or electric motors, or non-motorized as in paddle-driven canoes, kayaks, rafts, and rowboats. Air travel also can be both motorized (helicopters, planes, and ultralights) and non-motorized (ballooning, hang gliding and paragliding).

Travel management on the White River National Forest seeks to incorporate planning for appropriate movement of people and products across the forest. An efficient transportation network is essential for forest resource management, outdoor recreation use, and access. To balance the diverse needs of all those who use the system, the transportation network and the manner in which it is used must be effective in providing access, be properly maintained, and be ecologically sound.

Legal and Administrative Framework

Travel management on the White River National Forest must adhere to management direction on many levels. The travel management plan must adhere to all statutes, regulations, laws, executive orders, and national forest directives. Travel management on National Forest System lands must follow both federal and appropriate state level laws and regulations.

Management must be consistent with the overall direction in the White River National Forest Land and Resource Management Plan, 2002 Revision, as amended (forest plan). No amendments to the forest plan will be proposed through this travel management planning process. The travel management plan will adhere to all direction provided for in the forest plan. Therefore, the forest plan is incorporated into this document by reference.

Purpose of and Need for Action

Purpose

The purpose of this initiative is to identify the transportation system with the goal of balancing the physical, biological, and social values of the forest. It responds to several needs noted below.

Needs

Need: To Identify an Official Designated Travel System On the White River National Forest.

National direction requires national forests to clearly designate travel systems and opportunities. The existing travel plan was developed in conjunction with the 1984 forest plan. It is recorded in the 1985 White River National Forest Travel Map (USDA Forest Service/ White River National Forest 1985). Map corrections are needed for route locations, changes in ownership, and changes in area travel management due to the 2002 forest plan and inventory updates. Improved technology in mapping and information exchange has allowed for considerable refinement of the forest road and trail data.

The forest supervisor expressed the need to revise the forest-wide 1985 forest travel management strategy, described in the travel map of 1985, to align the travel strategy on the forest with the forest plan, along with any changes in laws and regulations. Travel strategies focus on which uses are going to be allowed where. These uses include motorized, mechanized, and non-motorized modes of transportation.

This action responds to the goals, objectives, standards, and guidelines outlined in the forest plan, and it helps move the forest toward desired conditions described in that plan. The White River National Forest Travel Management Plan will be developed in accordance with the forest plan and the laws and regulations that govern forest management.

By providing a designated travel system for the White River National Forest, the public will be able to clearly know where and what modes of travel are allowed and not allowed across the forest.

Need: To Identify What Is Not On the Official Designated Travel System On the White River National Forest and be Able to Restore Lands Back to Their Natural State.

Sometimes referred to as “ways”, “unauthorized”, or “user-created”, these roads and trails on National Forest System lands are routes that are not managed or recognized as part of the designated transportation system. These travelways have not been determined to be necessary for administration of National Forest System lands. Many of these routes are older timber, range, mining, or oil and gas exploration roads that no longer serve their intended purpose and were never properly closed. Others have been created by off-road/ trail recreation use. These roads and trails were created without due process and therefore are considered illegal.

The travel management plan will identify the designated system in summer. In so doing, user-created roads and trails will be examined for designation or elimination. This is a one-time consideration of these travelways as specified in the forest plan EIS (USDA Forest Service 2002b, p. 385-386).

The process outlined for the user-created routes in the travel management plan was to consider those that could possibly serve as designated road or trail. Most of these were nominated by both internal and external parties. Some were carried forward from old inventories. To be added, personnel examined the need, resource conditions, and public input. Those not added will be rehabilitated. Others not considered will also be rehabilitated. To have any new routes added to the designated system after the travel management plan is signed, NEPA will have to be initiated. All new routes considered will have to undergo the scrutiny that is equal to adding a constructed route to the system.

Upon conclusion of the travel management process, all user-created roads and trails on the landscape will be designated for elimination through rehabilitation. This includes any user-created route, whether or not it is considered in this process. All newly discovered user-created routes will be rehabilitated as they were created without the proper NEPA process.

Also included in the travel management plan will be the identification of designated roads and trails no longer needed, which will therefore be decommissioned.

This process will clarify the designated travel system for the forest. The end result of the travel management plan process will be a clear description of the travel system necessary for administrative and recreational use on the White River National Forest.

Need: Designate a Travel System That Is Aligned With the Forest Service Mission, Including the Need to Manage the Land By Providing a System That Attempts to Balance Social and Resource Demands.

Population growth and demand on the Forest resources has prompted the need to evaluate and designate a travel system to accommodate supply and demand placed on Forest Service lands, while still protecting those same lands for the conditions that enhance water quality, natural landscapes, and wildlife habitat.

Travel management, which plays an important role in every forest resource program, remains one of the most controversial elements in forest management. Since the 1985 plan was developed, motorized and non-motorized forms of travel have both increased and become more diversified. The advent of mountain bikes and ATVs, the growing popularity of four-wheel-drive vehicles and snowmobiles, and stable to increasing uses such as hiking, horseback riding, and backcountry skiing, all are competing for the same land base. Local communities near the forest have seen rapid growth in their populations, and tourism is on the rise.

Travel for recreation is not limited to activities that occur on the routes, but also includes access to other recreation activities such as camping, hunting, site-seeing, picnicking, and fishing. Lastly, access or networks are needed so one can get to a trail to participate in a particular activity like hiking, mountain biking, or horseback riding.

Access is also needed for other land management activities such as timber and habitat improvements, forest product gathering, range allotment maintenance, vegetation treatments, power lines, radio and cell towers, natural gas development, private land in-holdings, and administrative activities.

While there is a need to provide access for people across the landscape, there is also a need to protect the landscape from the impacts travel and people can cause. The footprint of a travel system can cause changes to the natural landscape that can cause additional sedimentation and fragmentation, and allow more people into an area.

Forest managers need to determine the proper balance in the type, extent, and levels of forest transportation facilities and uses in order to resolve user conflicts and adequately protect resources.

Proposed Action

The action proposed by the Forest Service to meet the purpose and need is to present a comprehensive travel management plan for the White River National Forest. The travel management plan and supporting environmental impact statement (EIS) will present options to accommodate and balance the transportation needs of the public and to provide adequate access for forest and resource management, while still allowing for protection of natural resources.

This document looks at the impacts of the travel system on recreation, administrative access needs, wildlife, and natural resources, among others. The intent is to have a clear and concise plan for a transportation system that addresses the needs for forest management, public access, and recreation use.

The objectives of the travel management plan are to:

- Bring summer and winter transportation systems into compliance with laws, regulations, agency or national direction, and the forest plan;
- Designate the forest roads and trails system and eliminate through rehabilitation those that are not part of the system;
- Provide a travel plan that defines modes of travel across the forest by area and by route;
- Identify resource solutions to impacts resulting from the transportation system, including routes identified for decommissioning.

To create appropriate strategies, travel will be defined by both summer and winter seasons. For summer travel, the travel management plan will define the designated roads and trails system along with allowable uses on these routes. For winter travel, it will display where motorized uses are allowed by area or designate routes. The travel management plan carries forward forest plan direction for determination of travel use opportunities.

Decision Framework

Geographic and Physical Scope

The Travel Management Plan for the White River National Forest will only make travel management decisions on White River National Forest lands. The White River National Forest travel management plan for summer travel will only make decisions on roads and trails that are under national forest jurisdiction. Only roads and trails that are all ready in existence will be considered in this document. No new road or trail construction or reconstruction is part of the decision.

User-Created Roads and Trails

Decisions have to be made regarding the miles of user-created routes across the forest. They either have to be added to the system or decommissioned. The forest is making a commitment in this document to evaluate user-created routes submitted by the public and from within the agency, routes that may be necessary for the transportation network. This

will also fulfill the obligation to look at user-created routes as stated in 212.52 of the rule. All user-created routes considered were examined on the ground by ranger district personnel to ensure they truly are necessary and are in good enough shape to be added to the system. All routes considered not necessary for the system or routes that would require construction or reconstruction work to be brought to an acceptable standard are going to be considered unauthorized and will be rehabilitated.

Some user-created routes are not part of the evaluation because they were either not submitted, not found in good enough condition to be considered, or created subsequent to the inventory (and thus created illegally).

All user-created routes discovered subsequent to this document will also be considered unauthorized and be rehabilitated.

Any route proposed after the signing of this document will be considered new construction. The process for construction of a new road (or trail) is quite extensive. The process includes examination of the purpose and need, travel analysis, NEPA, surveying, design, contract preparation, and all construction costs.

The treatment of these user-created roads and trails is consistent with the forest plan EIS. "Public scoping has shown that some of these unclassified roads and trails are of interest and value to forest users. For all, management objectives need to be developed. Decisions will be made in the travel management plan to designate these routes or eliminate them. In most cases, the objective will be to eliminate the routes by obliteration, along with all subsequent routes created there after. Any new route, road, or trail that needs to be created will have to have a compelling need and will go through the proper process before construction" (USDA 2002b, p. 3-386).

White River National Forest Land and Resource Management Plan – 2002 Revision, as Amended (Forest Plan)

The Travel Management Plan will adhere to the forest plan. As established since the beginning, this Travel Management Plan is not going to amend the forest plan; it will comply with the forest plan. The reason for this decision is that the forest plan went through an intensive NEPA process that resulted in a final plan and record of decision. The travel management plan is not the mechanism to change that decision, rather to develop a system that helps to meet forest plan desired conditions. Therefore, the action alternatives do not vary in forest-wide direction as established in the forest plan; however, they do vary in mileage and acreages allocated to each type of use. The forest plan defines a set of goals, objectives, strategies, standards, and guidelines that provide the forest-wide direction for managing the White River National Forest and its resources.

Forest **goals** are broad statements that describe overall conditions managers will strive to achieve. They are not directly measurable and there are no time frames for achieving them. In other words, goals describe the ends to be achieved rather than the means to these ends; they serve as vision statements. **Objectives** provide means in the form of measurable steps, referred to as **strategies**, taken to accomplish goals. Objectives generally are achieved by implementing projects or activities. However, objectives are not targets, which are a measure of annual outputs dependent on budgets.

The travel management plan will strive to meet the goals and objectives established in the forest plan.

Chapter 1 of the forest plan outlines the goals, objectives and strategies. While all apply, there are particular goals that the travel management plan can help to meet:

- Goal 1 – Ecosystem Health
- Goal 2 – Multiple Benefits to People
- Goal 4 – Effective Public Service

Also, the travel management plan must honor Goal 6 to help protect American Indian rights and interests.

Some of the key objectives are to:

- Protect the basic soil, air, and water resources;
- Provide for multiple uses and sustainability in an environmentally acceptable manner;
- Provide for a variety of species through management of ecosystems;
- Provide for scenic quality and a range of recreation opportunities that respond to customers and local communities;
- Emphasize cooperation with individuals, organizations, and other agencies in coordination with planning and project application; and
- Improve the financial efficiency of programs and projects.

All action alternatives adhere to the concepts of multiple use and ecosystem management. They also all share a set of basic forest-wide goals and objectives and a set of standards and guidelines that ensure protection of forest resources and comply with applicable laws.

Basic terms and conditions the forest plan sets for land management include standards, guidelines, desired conditions, and management areas.

A **standard** is defined as a course of action that must be followed or a level of attainment that must be reached to achieve forest goals. Adherence to standards is mandatory. Standards are used to assure that individual projects are in compliance with the forest plan and other legal mandates that govern the Forest Service.

A **guideline** is a preferred or advisable course of action or level of attainment. Guidelines are designed to achieve desired conditions (goals). Guidelines for the most part should be followed.

A forest plan also establishes additional direction for individual **management areas**, such as dispersed recreation, deer and elk winter range, or ski areas. The management areas are where emphasis is placed on the certain desired conditions for an area. While other activities may exist, the emphasis is still guided by the overall objective of meeting the desired condition for the specific management area prescription. **Management area direction** includes a desired condition statement, and defines which management activities may be carried out, with additional standards and guidelines needed to manage or protect specific resources.

Each management area prescription further defines what motorized and mechanized uses are allowed, restricted, or prohibited within each prescription. Some prescriptions also include restrictions on the density of roads within a management area. The travel management plan follows the guidance for each management area prescription to help meet desired conditions set forth in the forest plan.

For summer travel, the forest plan directed in a forest-wide standard that all motorized and mechanized travel must be on designated routes. All alternatives adhere to this

standard. When applying management area prescriptions, the forest plan essentially creates three summer strategies by management area allocation. The strategies are non-motorized / non-mechanized; non-motorized; and motorized and mechanized use on designated routes. Some standards and guidelines dictate road density requirements and/ or seasonal restrictions to meet desired conditions.

For winter travel the forest plan contains standards and guidelines that dictate by management area where motorized winter travel (machines manufactured for over-snow travel) is allowed, restricted, or prohibited. The strategies for winter motorized travel equate to open terrain travel, travel restricted to designated routes, and non-motorized travel areas.

Further clarification of these strategies for recreation incorporates the **recreation opportunity spectrum (ROS)** designations. These designations, found in the forest plan, are used to inform the public on what types of recreational settings can be expected across the forest. The standards under *Travel System Infrastructure* (USDA Forest Service/ White River National Forest 2002a) refer to ROS classifications. These standards refer to the range of ROS classes found in each management area description. The guideline under *General Recreation,* forest plan, chapter 2, section 4, pages 1-31, refers to the ROS map itself. For recreation, roads and trails should blend and reflect the overall recreational setting of an area, as well as provide the necessary access needs.

The forest plan reflects the need to provide travel systems only where necessary while protecting resources and minimizing the effects from roads and trails where possible. There is also an emphasis on decommissioning and rehabilitating a road or trail when it is no longer needed for the purpose it was built or to protect resources. The concept is to have a system that meets the needs and attempts to also be economically viable. For areas where a route is not longer necessary the idea is to get that piece of ground back into production (into a natural state).

USDA Forest Service Rule; Travel Management–Designated Routes and Areas for Motor Vehicle Use; Revisions to 36 CFR Parts 212, 251, 261, and 295

On November 9, 2005, the Forest Service published a new rule on providing motor vehicle access to all national forests. The rule titled Travel Management: Designated Routes and Areas for Motor Vehicle Use, rewrote direction for motor vehicle use on National Forest System lands under 36 CFR 212, 251, 261, eliminating 295 (travel rule). The travel rule was written to address at least in part the issue of unmanaged recreation. The rule provides guidance to the Forest Service on how to designate and manage motorized recreation on the forest. The travel rule requires each national forest and grassland to designate those roads, trails, and areas open to motor vehicular use.

The travel rule provides regulations governing use of motorized vehicles, including off-road vehicles on Federal lands, to protect natural resources, promote public safety, and minimize user conflicts as directed in Executive Order 11644 – Use of Off-Road Vehicles on the Public Lands, February 8, 1972, as amended by Executive Order 11989, May 24, 1977.

Key Components of the Rule (36 CFR 212, 251, 261) Include:

Roads system management: a) Traffic on roads is subject to state traffic laws where applicable…b) roads or segments thereof may be restricted to use by certain classes of vehicles or types of traffic… (§212.5) Motor vehicle use on National Forest System

roads, on National Forest System trails, and in areas on National Forest System lands shall be designated by vehicle class, and if appropriate, by time of year…(§212.51a).

Meeting the requirement to establish a designated system for motorized use, the White River National Forest began by incorporating the standard in the forest plan that states that all snow-free motorized (and mechanized) use would be on designated routes and not include any open areas (USDA 2002a, Travel System Infrastructure, Standard 4, p. 2-36). The Travel Management Plan will establish which vehicles will be allowed on which routes, and what time of year, where appropriate.

To meet sections a) and b) of the §212.5 regulations, we have to look at the following components:

- Colorado state traffic laws regulate licensing, registrations, safety, and allowable modes of travel on public roads. Colorado state law also addresses the use of off-highway vehicles under Title 33, Article 14.5. Section 33-14.5-108 addresses off-highway vehicle operations prohibited on streets, roads, and highways. The section reads: (1) No off-highway vehicle may be operated on public streets, roads, or highways of this state except in the following cases:…(h) (I) When the United States or any agency thereof authorizes by any means such operation on lands units jurisdiction (II) No action is required to be taken by the United States pursuant to this paragraph (h) to authorize the use of off-highway vehicles on lands under the jurisdiction of the United States.
- There is an agreement with the Forest Service and the Federal Highways Administration (FHWA) in a Memorandum of Understanding (Forest Service Roads subject to the Highway Safety Act 1976, 1982)
- That maintenance level 3, 4, 5 roads are subject to “open to public” travel regulations.

On the White River National Forest

Under the current Travel Management order of 1985, no distinction was made between which vehicles were allowed on motorized routes. The White River National Forest has been managing motorized travel under a hierarchical system. Basically, if a full-sized vehicle is allowed, so is a jeep, ATV, motorcycle, and bicycle. This concept was accepted based on design. If a road is able to accommodate a full-sized vehicle, then conceptually by design it could also accommodate other vehicles such as ATVs and motorcycles under most circumstances.

Exceptions were made for some roads and trails based on site-specific conditions. For example, a paved road is not considered safe for certain uses, such as ATV use. Another example is when a use may conflict with other recreational or resource objectives, such as ATVs in a campground where dust could disrupt the camping experience. Other decisions to restrict use include safety considerations and/ or resource protections. Until recently, the amount of non-highway legal vehicle use (ATVs, motor-cross) was low enough that mixed use was not an issue in most areas. However, numbers have greatly increased. Between 1995 and 2003, off-highway vehicle registrations in Colorado rose by 223 percent, an average of 18 percent per year (SCORP, p. 15).

Obligations Under the Travel Rule and Travel Management

Under the travel rule, it was recognized that across the country motorized uses have increased substantially, and the Forest Service needs to get a handle on managing these uses. Also, as stated in the above regulation, the Forest Service is to designate what

motorized uses are allowed in what areas, and thus create a system that clearly defines what type of motorized use is allowed on what route. This system is not hierarchical, but rather designates what use is appropriate for each route. Several factors are considered when making determinations for use on roads and trails.

Safety

One major factor is whether a road that allows highway legal vehicles should or should not allow non-highway legal vehicles. A road that allows highway legal and non-highway legal vehicular use is referred to as mixed use. A major component of this issue is that in Colorado, ATVs cannot be licensed and therefore are not highway legal.

Under the rule, the forest is required to make independent decisions on the safety of each motorized use for each route. On most of the forest's maintenance level 2 roadways, where the surface is rough enough to keep speeds down and use levels are lower, mixing highway legal and non-highway legal use in most cases is generally not as much of a safety issue as it is on the level 3, 4, and 5 roadways, which are constructed and maintained for the speed and volumes of passenger car travel.

The White River National Forest conducted mixed-use studies on national forest roads designed to handle passenger cars. These roads include the major arteries across the forest. These studies reflect which roads would be safe for allowing licensed and unlicensed vehicles to utilize the same route.

Recreation Management

Often, users of the forest must rely on state, county, or local roadways to access forest roads and trails. State law prohibits non-highway legal motorized vehicle use on public roadways unless the jurisdiction controlling the roadway has made a formal declaration to allow that use.

This leads to the question of what makes sense from a recreation management standpoint. In order to provide a quality experience for motorized users, the network has to provide several miles of connected opportunity. Another factor is to look at what legally makes sense. For example, if a county road does not allow non-highway vehicle use and it directly leads to a Forest Service road, or if a road goes back and forth in jurisdiction and therefore back and forth between highway legal and non-highway legal use; the Forest Service would likely not allow non-highway vehicular use. This action prevents a scenario that may encourage illegal use on the sections of road that only allow highway legal use. The forest will work with the various state, county and local agencies to determine where non-highway vehicles may be legally used on routes under the control of those entities. Decisions in the final travel management plan will reflect the legality and practicality of non-highway motor vehicles to access areas of the forest. The practicality analysis will include factors such as the availability of adequate trailhead parking, need, and whether other legal options exist.

In addition to safety and access, the rule also requires the responsible official to consider the provision of recreation opportunities. For example, it would not make sense to allow ATVs on a road that is part of or connected to a road that does not allow ATV use, especially if the portion that would allow ATVs is only ¼ mile long (for example), or does not lead to a destination. This would not be considered a quality experience for the ATV user. Rather, it makes sense to develop and design networks for ATV and other non-highway legal vehicle users where they can access the quality and quantity of road and trail to have an enjoyable recreational experience.

Resource Considerations

Provisions under §212.55 require consideration of the effects of the designation of motorized use on National Forest System natural and cultural resources, public safety, provision of recreational opportunities, access needs, conflicts among users of National Forest System lands, the need for maintenance and administration of uses on roads and trails….; and the availability of resources for that maintenance and administration.

The White River National Forest presents in the travel management plan where motorized use may or may not be allowed. Key aspects to this are:

1) Examination of unauthorized routes for rehabilitation or inclusion into the designated travel system. Examination of system routes also needs to be conducted to determine whether their purpose is still valid or whether they are not needed for the travel system. Based on inventory efforts that included public input and involvement, the travel management plan will provide the foundation for decisions on these routes. Factors include whether these routes serve a need and whether there are any resource impacts, and if so, how they should be mitigated. Also, the forest has to consider whether it can afford the maintenance and administration of these routes. Although decommissioning and rehabilitation has initial costs, once a route is decommissioned or rehabilitated any resource impacts or administrative costs should essentially be eliminated.
2) Examination of existing system routes and whether they are suitable for certain vehicle uses, especially mixed use. Because maintenance level 3, 4, and 5 roads are considered “open to public” roads, special considerations have to be made as to whether these roads are safe for mixed use.

Other aspects of the decision regarding mixed use include the elements presented above where the decision-maker is required to consider safety, effects on resources, potential impacts to wildlife, ability to administer and enforce, and providing for recreation opportunities instead of recreational conflict. When making decisions for use across the forest, the decision-maker will take all these factors into account, including public input and comment.

Winter Motorized Use

Directives for use by over-snow vehicles are included in the rule under Subpart C, §212.80 and §212.81. An over-snow vehicle is defined as a motor vehicle that is designed for use over snow and that runs on a track or tracks and/ or a ski or skis while in use over snow §212.1. The directives specify that over-snow vehicles may be allowed, restricted, or prohibited. The rule states that the responsible official may use the process outlined in §212 to establish where over-snow vehicles would be allowed, restricted, or prohibited. The difference between the summer motorized designations and winter motorized designations is that the Forest Service has to officially designate where summer motorized use is allowed; for winter, the Forest Service has the option to show where winter motorized use is restricted or prohibited. The White River National Forest has chosen to follow the process outlined in the rule through the travel management plan and subsequently will produce winter motor vehicle use maps to show where motorized winter use is allowed, restricted, or prohibited.

During the winter season, motorized and mechanized vehicles other than those defined as motorized over-snow vehicles in 36 CFR 212 are prohibited unless designated as allowed in the winter motor vehicle use map. This prohibition includes vehicles designed for travel during the summer and retrofitted with optional equipment for over-snow travel in the winter.

Parking Off of Designated Roadways and Trails

The rule provides the responsible official with the opportunity to authorize the limited use of motor vehicles within a specified distance of certain designated routes, and if appropriate, within specified time periods solely for the purposes of dispersed camping or retrieval of a downed big game animal by an individual who has legally harvested that animal (§212.51).

The national rule does not make allowances for any use off of the road prism other than for two purposes: dispersed camping and game retrieval. Driving off the road for the purpose of game retrieval has never been authorized on the White River National Forest and the forest will not enter into any analysis to allow that use.

The forest plan identifies that the forest will permit motor vehicle travel up to 300 feet from designated travel ways for direct access to campsites, parking, firewood cutting, or gathering forest products provided that: minimal resource damage occurs and such access is not otherwise prohibited (USDA 2002a, p. 2-36). The forest plan does not allow for motorized travel off travel ways for game retrieval. There are some routes that have special orders restricting any off-road travel and that only allow dispersed camping in designated sites.

Driving off of the road for the purpose of fuelwood cutting and gathering of forest products may still be allowed to continue through the permitting system. Permits have long been required for the removal of forest products such as firewood. The new regulation gives allowance for driving off of designated roadways for a specified distance that is specifically authorized under a written authorization issued under Federal law or regulation (§212.51(a)(7)).

Other special uses under permit that may allow off-road travel include administrative activities such as utility maintenance, range and livestock management, vegetation management, mining, residence maintenance, and outfitter-guide activities. All permits that allow off-road travel will have to be very specific as to what type of use is allowed, for what purpose, when the use is authorized, and where the off-road use is allowed to occur.

Driving off designated roadways and trails for any other purpose is inconsistent with the rule. There is a recognized need for persons to be able to pull off of the traveled portion of the roadway for a number of reasons such as parking, picnicking, etc. There is currently a national effort underway to create clear guidance on the distance a person is allowed to pull off of the traveled surface strictly for parking purposes. National direction may be set through agency directives in the Forest Service's manual and handbook system. The White River National Forest will incorporate the new national direction on parking.

Tie to Travel Management Plan and Beyond

The White River Travel Management Plan takes measures to meet the intent of the rule. The travel management plan however goes beyond the rule because travel systems and recreation use goes beyond just summer motorized travel. The goal of the travel management plan is to lay the foundation for establishing the transportation network needed for forest management and public use/ access. The travel management plan specifies the designated system by all modes of travel and season to convey appropriate uses of the travel system. When tied together, these specific designations create a logical system of routes over which people can travel in order to enjoy the national forest.

So why specify certain modes of travel on each route? One reason is because many people come to enjoy a particular experience that occurs on the route itself, be it to hike, mountain bike, horseback ride, ATV, motorcycle, go 4-wheel-driving, or even go for a pleasure drive. Conflicts can occur when a route can only accommodate so much traffic or where certain types of uses disrupt the experience of another. Certain routes are designed to accommodate only certain types of use. Safety to the user is a key consideration that is factored into route design and types of use allowed. The Forest Service also has a responsibility to minimize impacts on the land. Resource considerations such as soils, wildlife, and water quality are factors that need to be considered when allowing certain types of use.

The travel management plan is a platform from which the White River National Forest will be able to present the designated system. Once completed, the designated system will be legally indoctrinated by:

Creation and distribution of a Motor Vehicle Use Map as specified under the rule in §212.56. This map will only display where motor vehicle uses are allowed on roads and trails. It will specify seasons of use and only identify use for motorized over-land (not snow) vehicles. This map becomes the official legal documentation for allowable motorized use and will be enforced as such.

Creation and distribution of a Motor Vehicle Use Map for over-snow vehicles. The creation and use of the rule to produce this map is allowed under §212.81. This map will display where motorized over-snow vehicle use is allowed, restricted or prohibited.

Other allowances and restrictions will be reflected in order(s) based on the decisions made in the travel management plan record of decision.

It should be noted that travel management and decisions are not static decisions, but are continually examined to provide the best opportunities and reduce impacts where and when necessary. In fact, §212.54 discusses the need for revision of designations. Designations of National Forest System roads, National Forest System trails, and areas on National Forest System lands may be revised as needed to meet changing conditions.

Decisions to be Made

The deciding official, the forest supervisor, will review the purpose and need, the proposed action, the alternatives, and the environmental consequences to make the following decisions:

1) Designation of the summer roads and trails system:
   a) Defining the designated forest roads and trails;
   b) Defining what modes of travel are accepted on each road and trail;
   c) Deciding whether to incorporate or rehabilitate user-created routes;
   d) Determining if certain forest routes are no longer needed as part of the system and identifying those for decommissioning.
2) Designation of winter uses:
   a) Designating open areas and routes for motorized use by vehicles made for over-snow travel.

The record of decision (ROD) accompanying the final EIS will detail the decision.

The SDEIS decisions to be made were simplified to focus on the decisions that are legally necessary for travel planning. Foot, horse, cross-country skiing, and snowshoe travel is allowed on all White River National Forest System lands (unless specifically restricted by an order). All routes on the summer map allow foot and horse travel unless specifically prohibited. There are some trails that due to safety issues do not allow horse use. All areas on the winter map are open for cross-country skiing, snowshoe, and foot travel unless specifically shown to be prohibited.

The travel management plan carries forward forest plan direction and establishes the baseline for travel across the forest. Since this is incorporated by design, it is unnecessary to create area strategies. Area strategies were basically maps that represented areas where motorized and non-motorized activity is allowed, restricted, or prohibited. Since these are based on forest plan direction, it was determined that to create them for the travel management plan would be redundant. Any future amendments (outside of this process) to the forest plan will also be carried forward into the travel management plan if changes affect travel management.

Site-specific project level decisions will continue to be made over time. Some of these decisions can include changes and additions to the roads and trails system or changes to winter uses. No new construction of roads or trails is proposed in this document, but construction may be initiated through some future project-specific analyses. Some project proposals may also include changes in recreation, such as new routes to create loop opportunities. The travel management plan and associated maps will be updated to reflect any decisions that contain travel management changes.

Public Involvement

The White River National Forest travel planning effort was initiated in response to a demonstrated need in the 1997 analysis of the management situation (AMS) and the public interest during the creation of the forest plan. The draft forest plan, released for public comment in August 1999, contained a detailed travel management plan. The decision-maker decided to separate the two decisions based on public comment about the difficulty in reviewing both the travel management and forest plan decisions simultaneously and the desire for more time to review travel management. Planning information from the initial effort, including site-specific comments received during the comment period on the draft forest plan, helped to formulate the platform and considerations to be made in this travel management plan.

The notice of intent (NOI) for the travel management plan was published in the *Federal Register* on August 27, 2002. The NOI asked for public comment on the proposal from August 27, 2002 to October 31, 2002. The agency held six public meetings in September 2002 to introduce the travel management plan process and solicit comments. Open houses were held at ranger districts, where many members of the public visited and provided input into the process.

Some of the comments provided specific information on the current inventory of non-system or user-created roads and trails and winter recreation areas. This information was used to update the computerized inventory base layers.

During the public scoping period the White River National Forest received more than 580 letters. The USDA Forest Service Content Analysis Enterprise Team analyzed all the letters submitted during scoping. The team uses an established analytical process for transferring, sorting, disseminating, and categorizing letters into a database where individual comments were then evaluated. More than 2,000 comments were derived from

public scoping letters. Using the comments from the public and other agencies (see Issues section), the interdisciplinary team developed a list of issues needing to be addressed in this document.

The White River National Forest released the Draft EIS for the White River National Forest Travel Management Plan on July 28, 2006 for comment. During the comment period meetings were held with individuals, interest groups, and government representatives by numerous White River National Forest staff members. Over 600 CD's were distributed and the document was available on the White River National Forest web site along with an interactive map. There were 1447 comment letters, e-mails, and faxes received on the proposed White River Travel Management Plan and Draft Environmental Impact Statement during the public comment period, from July 28 to October 26, 2006. Of the 1447 comment letters, 589 were organized response (form) letters and 858 were unique responses. These submissions contained a total of 3,958 identified comments or expressions of concern on specific topics. Of the 3,958 comments 2,237 were site-specific and addressed particular routes or areas. Other comments addressed general or programmatic issues, concerns, support, ideas, or solutions. Forest Service responses to comments are available for review on the White River National Forest website at www.fs.fed.us/r2/whiteriver.

Issues

Issue definition helps highlight those issues of public concern, as well as those of internal concern, relating to the initial proposal. Issues are derived during the initial environmental analysis process, generally during scoping. Once a list of issues is identified, those issues are analyzed through interdisciplinary review and categorized.

The interdisciplinary team for travel management reviewed all comments in the database and categorized each comment into significant and non-significant issues. Council on Environmental Quality (CEQ) NEPA regulations, Sec. 1501.7, direct the team to "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…"

Significant Issues

NEPA regulations define significant issues as matters that are bound up in the nature of the proposed action and in the choice among alternative courses of action. These are issues that are related to the proposed action or its implementation. Many of the significant issues that deal with effects are tracked through the analysis process but are not considered key issues. Key issues are those that have the ability to drive alternative formulation. Significant issues were grouped to create the key issues, and then alternatives were derived.

Non-Significant Issues

Non-significant issues have a range of definitions. Generally these are identified as those issues that are:

- Outside the scope of the proposed action;
- Already decided by law, regulation, or other higher-level decision;
- Already decided by the forest plan;
- Conjectural and not supported by scientific or factual evidence; an opinion.

Non-significant issues identified through scoping or comments are generally not addressed by the alternatives described in this document as they fall outside the purpose and need and decisions to be made.

Key Issues from Scoping

The Forest Service identified the following key issues during scoping:

- Volume and type of recreation access;
- Resolution of recreation conflict;
- Protection of natural resources.

Key Issues from DEIS Comment Period

Issues raised during the DEIS comment period echoed those of the scoping period. Hundreds of separate concern statements were raised and responded to. Most fell within the key issues all ready identified during scoping. The key issues identified above continued to be the primary concerns. For more details the reader is encouraged to review the responses to comments documents.

Other comments focused on the need to reflect on the costs of the transportation system including maintaining, rehabilitating, and decommissioning. General concerns still center around the need to provide for certain uses. People tend to lean toward a use they are looking to do on the national forest. Some understand the growing population and recognize that other uses occur as well, and made very good suggestions as to how to accommodate them. Issues were also raised about how much infrastructure the forest could afford to add and which routes would be good or not good to add due to condition or cost. While many requested a separation from other users, most wanted their use to remain available close to where they recreate. Over 2000 comments were on site-specific roads, trails, and winter use areas. Some specific routes or areas had several comments that reflected a range of wants, i.e. to allow motorized, restrict motorized, add a route, do not restrict my use of choice, etc. Some of the same routes or areas had opposing views as well.

The White River National Forest appreciates the time people took to input their ideas and was able to utilize many of the informative and helpful suggestions. The comments were heavily considered in development of the SDEIS. The staffs responsible for the site-specific recommendations for alternative development were also the same members who reviewed and responded to the site-specific comments. The staffs responsible for analysis were the same members who reviewed and responded to the programmatic comments. This effort involved most of the Forest Service personnel across the entire White River National Forest that incorporated their expertise into the travel management plan.

The preferred alternative was derived from the previous alternatives presented in the DEIS that were designed to address the three key issues. As stated in the DEIS, blending the concepts and ideas from the previous alternatives presented the best solution to trying to meet the goals of the travel management plan. In total the “blend” is not evenly distributed, rather each geographic area was examined and determinations were made as to how each would best serve the forest as a whole when it comes to travel. The further incorporation of the travel rule also influenced how networks were designed. Then, perhaps most importantly, was the consideration of the comments, which really helped the forest to design, simplify, and incorporate the many thoughts presented to us.

Valid Outstanding Rights

The travel management plan was prepared with the understanding by the Forest Service that individuals and entities may have established valid rights, unknown to the Forest Service at this time, to occupy and use the National Forest System lands under laws and authorities established by Congress. The courts have established that such valid outstanding rights may be subject to some federal regulation (Sierra Club v. Hodel, 848 F 2d. 1068, 10th Circuit, 1988). This plan recognizes that such valid outstanding rights may exist and the Forest Service will certainly honor such valid outstanding rights when it is subsequently determined that the specific facts surrounding any claim to such rights meet the criteria set forth in any respective statute granting such occupancy and use (Washington County v. The United States, 903 F. Supp. 40, D. Utah, 1995). Upon discovery of such valid outstanding rights, amendment or modification of the travel management plan may be necessary.

Nothing in the following restrictions shall be construed as prohibiting the use of a wheelchair, by a person whose disability requires use of a wheelchair, in any area open to public foot travel. For the purposes of this statement, the term wheelchair means a device designed solely for use by a mobility-impaired person for locomotion, which is suitable for use in an indoor pedestrian area (Title V Sec. 507(c) of the ADA).

CHAPTER 2: ALTERNATIVES

Introduction

This chapter describes and compares the alternatives considered for the travel management plan (TMP). This section also presents the alternatives in comparative form, defining the differences among the alternatives and providing a clear basis for choice among options by the decision-maker and the public. Chapter 3 will present the current condition and effects of the alternatives in detail.

Included in this chapter is a discussion of:

- How alternatives were developed;
- Features of each alternative, including the no action alternative;
- Alternatives that were considered but eliminated from detailed study;
- How alternatives compare to one another; and
- Which criteria varied among alternatives.

Development of Alternatives

The process begins when the decision-maker determines there is a need for action. A proposed action is developed to meet the purpose and need for change. In this case there is a need to update and establish the travel management system for the White River National Forest (see Chapter 1, Purpose and Need, Proposed Action). Once a proposed action is presented, comments are solicited to determine if there are issues and alternatives to the proposed action that can meet the purpose and need. This gives the decision-maker options to select from.

From all the public involvement efforts, the White River National Forest was able to develop alternatives (see Chapter 1, Public Involvement) to address primary issues. Based on comments received on the draft environmental impact statement (DEIS), a preferred alternative, along with a no action alternative and a minimal action alternative, was derived for this supplemental DEIS (SDEIS). This effort is a continuation and compilation of all efforts before and is being presented to the public for comment.

Important Points Shared By All Alternatives

The travel management plan will:

- Provide for multiple uses and sustainability in an environmentally acceptable manner;
- Emphasize cooperation with individuals, organizations, and other agencies in coordination with planning and project application;
- Strive to improve the financial efficiency for travel management;
- Meet forest-wide goals and objectives and a set of standards and guidelines that ensure protection of forest resources;

- Comply with applicable laws; and
- Help meet the desired conditions laid out in the forest plan.

A number of designations and activities will not change in the travel management plan. These include:

- Existing permitted use, including ski resort developed areas and infrastructure;
- Existing developed recreation sites, utility corridors, and electronic/utility sites;
- Existing rights-of-way;
- Current designated national scenic and recreational trails and byways;
- Motorized and mechanized use is not allowed in designated wilderness areas; and
- Any federal, state, tribal, or local official in the performance of official duty could receive permission to enter restricted areas or use restricted types of vehicles by Forest Service personnel.

Updated data and analytical procedures, as well as evolving scientific knowledge, have been incorporated into all alternatives.

Common Elements Under All Alternatives

Terminology

The following are commonly used terms in the document that are listed here to help the reader understand how they are used. See the glossary for the definitions of other words commonly used throughout the document.

System roads and trails are those that are under the jurisdiction of an individual or government entity. These are legally defined as to their existence, allowable uses upon them, and responsibility for maintenance. These make up the designated travel system.

Unauthorized roads and trails are roads or trails on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a road or trail; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization. Synonyms: *non-system road, non-system trail, user-created and way.*

User-created roads and trails are those that have not been claimed by an owner. Other terms used in the past include ways, and ghost roads and trails. These also include old roads and trails that may have been missed during past travel management inventory processes, or roads and trails that were once on the system and never properly closed or added. User-created is also used in this document to represent routes not on the system.

Roads and trails that are on the system but are no longer needed are decommissioned.

Roads and trails that are user-created and need to be returned to a natural state are rehabilitated.

Decommissioned and rehabilitated are terms used to ‘remove routes from the landscape and return them to a natural state’. See the glossary for further explanation of these terms.

Regulatory

- The following statement of exemption will be stated in the final travel order and motor vehicle use maps (MVUM): Except in wilderness and other congressionally designated special areas, the following may be exempt from prohibitions when granted by the forest supervisor:
  a) Limited administrative use by the Forest Service;
  b) Use of any fire, military, or law enforcement vehicle for emergency purposes;
  c) Authorized use of any combat or combat support vehicle for national defense purposes;
  d) Law enforcement response to violations of law, including pursuit; and
  e) Use and occupancy of National Forest System lands and resources pursuant to a written authorization issued under federal law or regulations. Note: emergency access and law enforcement pursuit does not necessarily require permission from the forest supervisor.
- In designated wilderness the following persons may be exempt form prohibitions:
  a) Persons with a Forest Service permit specifically authorizing the otherwise prohibited act or omission; and
  b) Any federal, state or local officer, or member of an organized rescue or firefighting force, in the performance of an official duty.
- The forest supervisor has the authority to issue special orders limiting or changing access for protection of the natural resource, wildlife, or safety.
- Off road parking for dispersed camping is 300 feet from any road open for motorized use or as determined by the responsible official, i.e. camping and off road travel through a special order are restricted to designated camping sites only. No off road travel will be allowed for game retrieval. Off road parking for special uses such as forest product gathering will be specified and issued by special use permit. Off road camping and parking must not damage the land, vegetation, or streams and no live trees may be cut (FSM 2355.30, 36 CFR 212).
- Nothing in this plan precludes future project-specific environmental analysis from proposing the construction of new system roads and trails.

Mode of Travel

- **Air travel**: All aircraft including but not limited to airplanes, helicopters, hang gliders, para-gliders, balloons, and ultralights, will be required to have a special use permit for take-off and landing locations on White River National Forest lands or waterways (36 CFR 261.58).
- **Boat travel**: Motor boats with gas or electric motors are allowed only on Dillon Reservoir, Green Mountain Reservoir, Ruedi Reservoir, Homestake Reservoir, and Shoshone Forebay. Boats with electric motors also are allowed on Heart Lake, Deep Lake, Meadow Lake, Sweetwater Lake, Chapman Reservoir, and Crescent Lake. All other bodies of water—lakes, streams, and reservoirs—are limited to non-motorized boating. Human contact is prohibited in Dillon Reservoir. Human contact or boating of any kind is prohibited on Maroon Lake and Hanging Lake (36CFR 261.58).

Travel Opportunities

The travel management plan maps and subsequent orders are separated into two seasons. The summer and winter map do not overlap. When one ends the other begins. It is expected therefore that all summer motorized and mechanized uses end on the date specified and transition to allowable winter motorized uses, then reverse back on the date specified.

Summer Season

Summer season is considered the snow-free season. Summer season begins Thursday 0000 midnight before Memorial Day and ends 1159:59 the second Sunday in November.

During the summer season all motorized and mechanized travel is restricted to routes designated for each particular use type—full-sized vehicles, all-terrain vehicles, motorcycles, mountain bikes, and all other mechanized vehicles used for human transport. Other designations include pack and saddle, and foot.

Some roads and trails may remain closed beyond the end date or be closed prior to the opening date when ground conditions are not sufficient to allow traffic without causing resource damage. Some roads and trails may remain open prior to the opening date and after the closing date on a site-specific basis, only when the authorizing official determines there is a public need and ground conditions are sufficient to allow the activity. Any exceptions to the listed dates will be made through a line officer's special order and posted at the specific location.

Winter Season

Winter season is considered the snow season. Over-snow motorized travel begins 0000 midnight second Monday in November. The over-snow motorized travel ends Wednesday 1159:59 before Memorial Day.

An over-snow vehicle is defined as a vehicle that is designed for use over snow and runs on a track or tracks and/or ski or skis while in use over snow (36 CFR 212.1). These are vehicles primarily designed for winter use, not retrofitted with skis, tracks, chains, and/or other equipment for winter operation. Any other vehicle other than defined by 36 CFR 212 for winter use, including wheeled vehicles such as full-sized vehicles, all-terrain vehicles, motorcycles, mountain bikes, and mechanized vehicles, are prohibited, unless on a plowed road.

Under certain conditions over-snow vehicle use may remain open prior to the opening date and after the closing date on a site-specific basis, only when the authorizing official determines there is a public need and ground conditions are sufficient to allow the activity. Any exceptions to the listed dates will be made through a line officer's special order and posted at the specific location.

All grooming operations on winter trails require a permit or other authorization. On National Forest System lands where groomed motorized winter trails are provided by the Forest Service, or through other approved providers, travel is restricted to snowmobiles and non-motorized/non-mechanized uses only. Machines such as snowcats or other tracked vehicles designed specifically for over-snow winter travel are prohibited from these groomed trails unless equipped with and operating a grooming implement that is designed to groom the trail behind the machine. On groomed non-motorized winter trails, travel is restricted to non-motorized/non-mechanized uses only, unless granted through permit or other authorization. The intent of this provision is to maintain the integrity of

the groomed snow surface and to protect the investment made in maintaining these winter routes for their intended purpose.

Legend Categories

Categories used to depict allowed uses for summer and winter and the time of year these are in affect are listed below. (Note: this also represents the legends used on the summer and winter maps; these reflect what will become the site-specific regulatory travel management categories and decisions.)

Winter

Dates: Begins 0000 midnight second Monday in November – ends the Wednesday 1159:59 midnight before Memorial Day

- Open motorized areas
- Restricted motorized areas with motorized routes only
- Prohibited motorized areas
- Total closure to all uses

Note: Motorized is for winter motorized (tracked) vehicles only. No wheeled vehicles will be allowed off of plowed roads and parking lots unless under special use permit.

Summer

Dates: Begins Thursday 0000 midnight before Memorial Day – ends 1159:59 midnight second Sunday in November

- Licensed motorized on designated route
- Licensed and unlicensed allowed on designated route
- Motorized vehicles less than 48 inches in width on designated route
- Two-wheeled (motorcycle) vehicles on designated route
- Mechanized (bicycles) on designated route
- Animal (horse) and foot (hike)

Note:

- All motorized and mechanized modes of travel must be on designated routes.
- All motorized categories generally allow mechanized (bike), animal (horse), and foot (hike) unless otherwise specified.*
- All mechanized will allow animal (horse) and foot (hike) unless otherwise specified.*
- Animal (horse) and foot (hike) are allowed to travel across country and generally on all routes. There are some routes that may limit animal (horse) use for safety reasons.*

*There may be some routes that are specific to a particular use that does not fit the above legend. These will be specifically noted (tabular).

Other categories may include closed to public and special-use by permit only.

All Seasons

At no time may any transportation use take place that will cause resource damage.

Additional site-specific closures and seasonal restrictions may be implemented either annually or on a case-by-case basis for management, wildlife, and resource protection through authorized travel orders. These site-specific travel restriction modifications will override the base summer and winter travel maps.

Special Areas and Permits

- Access for permitted activities (such as livestock operations, mineral exploration and development, maintenance of water developments, utility maintenance, timber management, ski area management, outfitter and guide operations, and special events) on National Forest System land is independent of general public access. Individuals or groups with special permits are allowed to conduct their business according to conditions outlined in their permits. If a permit does not stipulate exemptions to the forest's general travel regulations, the general travel regulations will apply.
- The Golden Horseshoe area on the Dillon Ranger District is designated intermix 7.1 management area in the forest plan. These areas stress collaborative management with local governments and user groups. An inter-government cooperative task force along with public group participation has been created to work on the management direction for the recreation uses within this area. The DEIS travel management plan presented the maximum amount of roads and trails in the Golden Horseshoe area for analysis purposes. Presenting the maximum number of roads and trails analyzes the maximum resource impacts this area would see. The SDEIS contains the roads and trails that are currently ready to be incorporated into the travel system. The task force will continue to design a system that projects the future roads and trails along with those that need to be decommissioned. The final system will be reviewed for incorporation into the final travel management plan. The public is encouraged to work with the task force to help the group design the final transportation system for this area.
- Ski areas are treated as year-round special areas in the travel management plan. The roads and trails dedicated to the ski area operation will be considered designated permitted routes under the ski area permit. The ski areas will be responsible for the management, operation, and maintenance of these routes. There are currently 211 miles of roads and trails under the ski area special use permits. Winter uses are controlled and managed by the ski areas as stated in their permits. Nordic centers are designated as special areas for winter operations. Any modifications to the baseline summer or winter operations presented in this document will be accomplished under the permit, through appropriate NEPA process and operating plan implementation.

The Alternative Development Process

Development of a travel management plan is a large and complex process. The White River National Forest decided to undertake developing a plan for the entire 2.3 million acres so that a consistent updated plan could be implemented.

This plan revision process started with the determination that there is a need to change the 1984 forest management plan travel management strategy, described in the travel map of 1985, because of changes in circumstances, legal mandates, societal uses, and societal

values. The White River National Forest presented a draft travel management plan in the forest plan DEIS. A decision was made to separate the efforts and develop the travel management plan after the finalization of the forest plan.

The White River National Forest initiated the development of the travel management plan in August of 2002. By implementing the initial inventory and scoping process both internally and externally, the White River National Forest developed the DEIS for release in June of 2006. The DEIS is incorporated into the SDEIS. The SDEIS is part of and a continuation of the overall process for development of the travel management plan as regulated by NEPA.

In the DEIS the White River National Forest updated the inventory and presented alternatives for the travel management plan. When looking at the number of features and decisions to be made, there is an infinite number of permutations and combinations that could be developed into alternatives. Therefore the Forest Service developed a strategy to limit the number of alternatives to study in detail while obtaining a range and providing a clear basis of choice. This strategy was to use the key issues and develop alternatives to examine ways to address these key issues. In the DEIS, comments on issues, preferences, and general direction were used to formulate the alternative themes. Scoping issues brought forward were further categorized into concerns such as: alpine protection, amount of decommissioning, maintenance costs, loop opportunities, access points, addition or elimination of unauthorized routes, social interaction of users, effects on watersheds and wildlife, spread of noxious weeds, separation of users, riparian and cultural resource protection, commodity access, special use access, administrative access, and others.

All these and others were categorized into three key issues: volume and type of access, resolution of resource conflict, and protection of natural resources. These then were used directly to form the action alternatives under consideration: optimizing recreation opportunities, providing for separation of recreation uses where possible, and emphasizing natural resources and habitat values while still providing for recreation. These focused themes allowed for the range of alternatives to be presented.

Once the alternative themes were established, the alternatives were developed by examining each road, trail (whether system or non-system), and winter use area. Based on site-specific comments, on the ground knowledge, and discussions with the public, the ranger district staffs evaluated and proposed a management strategy for each feature based on the alternative themes for C, D, and E. These were analyzed and presented in the DEIS.

The SDEIS has been developed in response to the comments received on the DEIS, which examined these three action alternatives and the minimal action alternative in detail. Several people commented that they had difficulty in sorting through all the details that make up the three action alternatives presented in the DEIS. The DEIS also stated "the final decision may result in the selection of any of the alternatives, a combination of alternatives, and /or from additional information and comments received …" In response, this SDEIS is being presented to the public for comment, to allow for the opportunity to review the full effort thus far in a concisely focused action alternative. This action alternative along with the minimal action and no action alternatives was developed from the previous DEIS effort including the incorporation of public comment, on the ground knowledge, and regulatory requirements.

Further Incorporation of the Travel Rule

In the travel rule, the agency acknowledges the need to mix highway legal (licensed) and non-highway legal (unlicensed) traffic on some National Forest System roads at maintenance levels 3, 4, and 5. These designation decisions will be advised by professional engineering study and analysis, as appropriate. Guidelines for Engineering Analysis of Motorized Mixed Use on National Forest System roads (USDA Forest Service 2005) outlines the procedures to be undertaken and factors to consider while analyzing the safety risks of authorizing highway legal vehicles and non-highway legal vehicles to operate on the same road (motorized mixed use). Safety and engineering considerations are to be evaluated while conducting the motorized mixed use analyses.

During 2006 and 2007, motorized mixed use analyses (professional engineering studies) were conducted on Maintenance Level (ML) 3–5 roads by the White River National Forest engineering department. These roads are the National Forest System arterials and collectors and the main access routes that the public uses to get to the forest. Studies include an evaluation for the potential for crashes as well as the severity of an accident should a crash occur. The crash potential rating is based on roadway factors such as traffic volume & type, surface type & condition, sight distances, driving speeds, and roadway alignment (horizontal & vertical curves). Crash severity ratings are based on roadside conditions (natural ground slopes, slope/height of embankments, and large unyielding features next to the road), speed, and traffic types (the larger the difference in size of vehicles, the greater the severity).

Motorized mixed use analyses were not conducted on ML 2 roads as these roads usually have rough uneven driving surfaces, slower driving speeds, and minimal use, and can safely accommodate the mixing of highway legal and non-highway legal vehicles. ML 3–5 roads usually have better driving surfaces, higher driving speeds, and greater volumes of traffic. ML 5 roads were excluded from the analysis as these roads, mostly paved, were determined to be unsafe for designation due to poor handling characteristics of OHVs on paved surfaces. ML 3–4 roads that access or move people around recreational facilities (campgrounds, picnic areas, scenic overlooks, boat docks, fishing areas, etc.) were also deemed unsuitable for OHV use in light of the recreational experiences users expect and the experiences the forest is trying to provide. Some ML 3–4 roads were excluded from analysis due to known heavy traffic volumes and unsafe road characteristics. Other ML 3–4 roads were excluded from the analysis as OHV use was inappropriate given forest plan direction for the area the road accesses.

District personnel requested motorized mixed use analysis on approximately 246 miles of roads being considered for designation, and these analyses concluded that approximately 132 miles could be designated for motorized mixed use without increasing the safety risk to the public. Of the 114 miles determined to have an increased risk to public safety, approximately 60 miles included management options that could be implemented to reduce that risk to a manageable level.

Some roads with mixed use may have the designation temporarily suspended due to forest management activities such as timber sale and natural gas exploration & development, and will have the designation restored once the commercial activities have been completed.

The DEIS presented a list of maintenance level 3, 4, and 5 roads that would likely allow and not likely allow mixed motorized use (Appendix I, DEIS). The SDEIS incorporates the engineering studies and their effects into Alternative G. Alternatives A and F present all 3, 4, and 5 routes as open mixed use, as they are today.

Description of the Alternatives

Each alternative for the travel management plan is presented in the same format, with the following components:

Background—The background to development of the alternative.

Theme—The emphasis of the alternative.

Relationship issues—How specific elements of the issues are incorporated into the alternative. In this discussion, the terms low, moderate, and high are used to compare levels of outputs or the relative degree of environmental impacts. No absolute measures are intended by these terms. For example, if an alternative calls for the highest level of road closure, it simply means that more roads will be closed under this alternative than under any other, not that a maximum possible number of roads will be closed. The words more and less are used in a specific context.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14).

The interdisciplinary team originally considered five different alternatives during scoping. The original alternatives—B, C, D, and E—were analyzed and disclosed in the DEIS. The action alternatives represented a reasonable range of alternatives for consideration. The SDEIS utilizes all the DEIS alternatives, public comment including corrections, and current regulations.

The following represents the action alternatives that were studied in detail in the DEIS.

Action Alternative C

Background

Alternative C responds to the issues of volume and type of recreation access.

Theme

Alternative C considers the forest's travel system. It takes advantage of accommodating recreation for more users where possible. It emphasizes shared use and optimization of available facilities, thus providing for a greater capacity for recreation across the forest.

Relationship Issues

Under Alternative C, key considerations are:

- Optimization of road and trail opportunities;

- Mostly hierarchical[1] recreation use on roads and trails;
- Likely to have fewer exclusive use roads and trails;
- Creation of more opportunity for people to disperse;
- Creation of the most miles available for a particular use (non-exclusive);
- Likely to have the highest recreation capacity;
- Identification of more loop opportunities;
- Likely to add more unauthorized routes and have less decommissioning of system roads and trails.

Action Alternative D

Background

Alternative D responds to recreation user conflict issues.

Theme

Alternative D considers the experience of the recreational user. It emphasizes reducing recreation conflicts among users and a more sustainable recreation program in the long term.

Relationship Issues

Under Alternative D, key considerations are:

- More separation of use, even consideration of some exclusive use;
- Does not necessarily follow hierarchal use of roads and trails;
- Individual decisions are made on the appropriateness of each type of use on each route;
- Main objectives are reduction of user conflict and long term recreation program sustainability;
- Identification of loop opportunities;
- Creation of more designated routes and play areas in winter;
- Likely to have fewer total miles or areas available to a particular use, but more miles available for shared uses on routes;
- Likely to add more unauthorized routes and have less decommissioning of system roads and trails.

[1] Hierarchical is a system in recreation describing allowable uses. The uses described are—from least restrictive to most—high-clearance vehicles, all-terrain vehicles, motorcycles, bicycles (mechanized), horse and pack animals, foot (hiking). Under the hierarchal system, the uses listed after the specified allowed use for a route would also be allowed on that route. For example, if high-clearance vehicles are allowed on a road, then so is every other use; if a trail is open to motorcycles it is also open to mountain bikes, animals, and foot traffic.

Action Alternative E

Background

Alternative E responds to the issues of managing recreation use to reduce the impacts on natural resources and wildlife caused by recreation.

Theme

Alternative E considers emphasizing natural resource and habitat values while still considering recreation utilization.

Relationship Issues

Under Alternative E, key considerations are:

- Designate travel systems to reduce impacts on habitats (wildlife) and natural resources;
- Mostly hierarchical recreation use on roads and trails;
- Likely to have more shared recreation use on a limited system;
- Likely to have fewer roads and trails to maintain and be more sustainable from an economic standpoint;
- Likely to cluster recreation in some areas;
- Allowance for more primitive, non-motorized recreation experiences;
- Identification of fewer loop opportunities;
- Likely to add the fewest unauthorized routes and have the most decommissioning of system roads and trails.

Several factors contribute to the reasons why C, D, and E are not re-examined in detail in the SDEIS:

The SDEIS is being developed to show progression to date, to go forward, and present where the forest is heading with the travel management plan.

These alternatives were already fully examined in the DEIS, and that study is still relevant and useful as part of the process to determine the final travel management plan. The objective of the SDEIS is to take this information, public comment, including corrections and updates, and develop a comprehensive, focused version of the travel management plan. This includes simplifying the legend, making corrections, and focusing on the desired travel management plan.

The decision-maker, along with Forest Service staff, was able to utilize the information presented in the DEIS to develop the alternatives presented in this SDEIS. To try and update the C, D, E alternatives and re-present them would not allow for a focused review, rather it would add to the complexity. It would not show the progress made to date. These alternatives were already commented on and decisions toward reaching the end goal for the travel management plan were made based on this. It would not be fair to the public to re-examine these again, as a lot of time and effort was put in by the public and the staff on these alternatives. This SDEIS displays the results from this detailed examination. It moves ahead.

Therefore, Alternatives Considered in Detail in the SDEIS is based on the all that has occurred thus far so the White River National Forest can achieve creating the final travel management plan.

Alternatives Considered in Detail

No Action–Alternative A

Background

NEPA regulations at 40 CFR 1502.14 state that "agencies shall: (d) include the alternative of no action." Guidance from the Council on Environmental Quality (CEQ) clarifies that the no action alternative be based on no change from current management.

The DEIS had Alternative A, current condition, as an alternative that was not considered in detail because it did not meet the purpose and need, and current forest plan direction. The SDEIS still recognizes the flaws of this alternative; however this alternative will be examined under Alternatives Considered in Detail in the SDEIS as the no action alternative.

As current conditions were analyzed, it became clear that significant changes had occurred in the known inventory. A large number of additional unauthorized routes were brought to the attention of the interdisciplinary team during the scoping process. Alternative A, although infeasible to implement, serves as a context for current condition for environmental analyses. The current resource conditions on the forest described in the affected environment sections of each resource reflect that "snapshot" in time.

Alternative A does not address the purpose and need and is not compliant with forest plan direction.

Theme

Alternative A considers the current condition for travel management on the White River National Forest. Alternative A is the no action alternative.

Relationship Issues

Under Alternative A, key considerations are:

For summer:

- The current condition is the current designated system routes with their current legal uses; motorized and mechanized uses can only occur (legally) on these routes;
- User-created routes are not legal to use by motorized or mechanized vehicles;
- Horse and hike use is allowed everywhere on the forest unless restricted by special order;
- Because it is current condition, user-created routes would not be rehabilitated (as rehabilitation is an action);
- No routes are adopted. No routes are decommissioned;
- Changes are not made to consider motorized mixed use per the travel rule, so no National Forest System routes are changed to licensed motorized only; and

- Changes to uses on routes are not changed to meet forest plan direction (as the forest plan did not address roads and trails site-specifically) or other regulations; rather they remain as is.

For winter:

- The current condition is equal to that of Alternative F because the forest plan did, through standards and guidelines, dictate where open, restricted, and prohibited areas of winter motorized activity can occur. Note that the forest is open to foot and other non-mechanized winter travel such as cross-country skiing and snowshoeing.
- The forest plan did not designate any specific routes or play areas in the restricted prescriptions. These need to be designated in the action alternative. Therefore this alternative and Alternative F have no motorized routes or open play areas in the restricted management area prescriptions.

Alternative F

Background

Alternative F represents the original Alternative B in the DEIS, with corrections made based on public comment.

Theme

Alternative F considers the minimum actions needed to bring the forest travel system into compliance with forest plan direction.

Relationship Issues

Under Alternative F, key considerations are:

- Standards and guidelines in the forest plan would guide management of the forest travel system.
- There would be no consideration of user-created routes for system designation. No user-created routes are adopted. All user-created routes are rehabilitated.
- All designated Forest Service system routes are carried forward in this alternative. Any Forest Service system routes currently out of compliance with the direction in the forest plan would be brought into compliance or decommissioned.
- All modes of travel will be compliant with forest plan direction.
- Changes are not made to consider motorized mixed use per the travel rule, so no national forest system routes are changed to licensed motorized only.
- Winter motorized use is dictated by forest plan management area and recreation opportunity spectrum direction. Management area prescriptions that are restricted to routes and play areas under this alternative would be non-motorized. The forest plan did not designate any specific routes or play areas in the restricted prescriptions. These need to be designated in the action alternative. Therefore this alternative and Alternative A have no motorized routes or open play areas in the restricted management area prescriptions.

Action Alternative G – Preferred Alternative

Background

Alternative G is a culmination of the travel management planning process. This alternative utilizes all the alternatives presented in the DEIS, public input, and further incorporation of the latest regulations for travel management.

The alternative was not built arbitrarily, rather it was built by considering the key issues and how to best address them. Consideration was given to how much can be provided, where to emphasize certain use types, and what improvements should be done to improve the landscape. Each comment was read and considered. Some comments are able to be met and some will not, as the forest cannot accommodate all uses everywhere and meet the goal of sound land management along with the need to provide for some separation of use.

The approach was to first look at the forest plan and regulations that guide travel management. Then, by looking at public input, forest needs, forest resources, and forest natural environment, design a system that is logical and manageable while serving access and recreation needs. The strategy included looking at the forest as a whole and identifying where certain uses could be best accommodated and provide quality experiences for publics. From there, site-specific systems were developed from past alternatives and site-specific comment input. This included adding user-created routes that enhance the system and removing those routes, either system or user-created, that do not enhance the system or are not sustainable. Overall, the forest had to consider how much it would be able to provide and manage.

Theme

Alternative G is the preferred alternative. This alternative strives to balance the public transportation needs, including recreation uses, with natural resource protection and enhancement. The alternative was designed to best meet the public desire to access and recreate on the national forest in a natural setting.

Relationship Issues

Under Alternative G, key considerations are:

- Meeting forest plan and regulatory guidance for travel management;
- Consideration of the alternatives and information presented in the DEIS;
- Consideration of all public input from scoping and DEIS comments;
- Consideration of the mixed use safety studies and application of these into network planning;
- Presentation of the summer roads and trails system and uses for each route;
- Consideration of user-created routes for adoption or rehabilitation;
- Presentation of system routes no longer needed to be decommissioned; and
- Presentation of where motorized over-snow travel is authorized, restricted, and prohibited during the winter season. Includes presentation of over-snow motorized designated routes in restricted motorized areas.

Comparison of Alternatives

This section provides a summary of each alternative.

Table 2.1—Summary of summer travel management by miles on the White River National Forest

Legend	Alternative A	Alternative F	Alternative G
Licensed motorized only	15	15	585
Licensed and unlicensed allowed	1724	1724	850
Motorized vehicles < 50” in width	109	109	143
Motorized two-wheeled vehicles	43	43	67
Mechanized (bicycles)	740	737	596
Foot and horse (pack animal)	1339	1344	1440
Managed under special use permit	126	125	212
Roads in storage (not open to motorized use)	60	59	32
Routes not added to the system, but not decommissioned or rehabilitated	1252	0	0
Routes to be/or already decommissioned or rehabilitated	0	1252	1483
Total	**5408**	**5408**	**5408**

Description of the summer legend:

Licensed motorized only: motorized vehicles must have a license plate recognized under Colorado state law; this category also generally allows mechanized, foot, and horse travel

Licensed and Unlicensed allowed: all motorized, mechanized, foot, and horse travel is generally also allowed

Motorized vehicles < 50” in width: all motorized vehicles with a wheel base of < 50” in width; mechanized, foot, and horse travel is generally allowed

Motorized two-wheeled vehicles: all motorized vehicles with a maximum of two-wheels (generally motorcycles), mechanized, foot, and horse travel is allowed

Mechanized: no motorized; mechanized, foot, and generally horse travel allowed

Foot and Horse: only foot and generally horse (pack animal) allowed

Managed under special use permit: roads or trails under special use permit such as outfitter guides, range, natural gas, minerals, private, and other commercial uses; does not include the 211 miles under ski areas

Closed to the public but still on the system: maintenance level 1 roads (in storage that are not being maintained to allow a pathway for a particular non-motorized use, rather being allowed to return to nature until needed again), historic roads (such as Camp Hale)

Routes not added to the system, but not decommissioned or rehabilitated: roads and trails not on the system, where no action is taken to actively decommission or rehabilitate them

Routes to be/or already decommissioned/rehabilitated: roads and trails either already or to be decommissioned (system) or rehabilitated (user-created). Some roads and trails may have already been decommissioned or rehabilitated, however these closures may not have been effective and these footprints remain, therefore further action may be required.

Note: generally allowed means that in most cases the other use types listed are generally allowed, exceptions may apply such as hiking only, mechanized and hiking only, etc. (see use type table)

Table 2.2—Summary of summer use type (what is available to the public by each travel mode) by miles on the White River National Forest

Legend	Alternative A	Alternative F	Alternative G
Licensed motorized full-size vehicle	1739	1739	1435
Licensed and unlicensed full-size vehicle	1724	1724	850
Licensed motorized two-wheeled vehicle (motorcycle)	1891	1891	1645
Motorized vehicles < 50” in width (ATV)	1833	1833	993
Motorized two-wheeled vehicles (licensed and unlicensed motorcycles)	1876	1876	1060
Mechanized (bicycles)	2631	2629	2233
Pack animal (horse)	3966	3967	3629
Foot (hike)	3970	3972	3681
Total miles open public routes	**3970**	**3972**	**3681**

Table 2.3—Summary of roads and trails to be added or to be or already decommissioned/rehabilitated

Legend	Alternative A	Alternative F	Alternative G
System roads or trails to be or already decommissioned	157	157	668
Non-system roads and trails remaining as a footprint but illegal	1095	0	0
Non-system roads and trails to be rehabilitated *	0	1095	815
Total miles to be decommissioned/rehabilitated	0	1252	1483
Non-system routes to be added to the system	0	0	281

**132 miles have had some rehabilitation, yet more may need to be done*

Table 2.4—Summary of winter opportunities on the White River National Forest

Legend	Alternative A	Alternative F	Alternative G
Open motorized areas (acres)	772,489	772,489	706,497
Restricted-motorized on routes only (acres)	441,336	441,336	507,327
Motorized prohibited areas (acres)	1,017,739	1,017,739	1,017,739
Special use permit (acres)	54,908	54,908	54,908
Designated motorized routes within restricted areas (miles)	8	8	237

Table 2.5—Comparison of effects by alternative

Indicator (key issue)	Alternative A	Alternative F	Alternative G
Meets laws, regulations, and forest plan	Does not meet	Meets forest plan, does not meet the full intent of the travel rule	Meets all laws, regulations, and forest plan
Volume available for use	Has the most for summer, equal to F for winter	Has most mixed use, does not add any user-created	Has the least in summer, but higher quality as some user-created (highly sought) are added, more winter motorized available as routes are designated
Opportunities for separation of use	The least, as it retains the hierarchy and does not add any user-created for certain uses. See Alternative F for winter.	Still low, but does close some routes to motorized based on the forest plan. Winter is either open or closed to motorized, separated, but does not place motorized in desired locations (further out open areas) as there are no routes through restricted areas to get there. As a result, may lead to more overlap of users closer to access points.	The most, as it allows for changes in designation and adds user-created routes that were nominated by certain user groups. Winter is about equal, to A and F, routes through restricted areas allow for motorized to go from open area to open area without disruption to the whole restricted area.
Land and resource protection	The least, as no routes are rehabilitated. Routes are not added where needed, nor taken away where not needed.	Rehabilitates all user-created routes. Does not exchange routes or add/take away routes where necessary for resource protection needs.	Selects a system that considers resource needs, including removing and rehabilitating routes no longer needed, and adding some that may be better on the landscape. Alternatives F and G are close in most analyses when it comes to resource protection.

Monitoring

Monitoring

The travel management plan is tiered to forest plan desired conditions, goals, and objectives and follows all standards and guidelines. The forest plan monitoring strategy evaluates the desired conditions, goals, objectives, and effectiveness of standards and guidelines. Monitoring questions related to travel management and resource conditions are listed in the forest plan monitoring strategy. These questions link to monitoring items that answer whether travel management is being effectively managed on the forest. The forest plan monitoring report and the annual accomplishment report provide the information to determine if travel management goals are being met. Monitoring of motorized uses as part of the forest's land management plan is required in 36 CFR 212.57.

The monitoring plan is not a decision to be made; rather it is a tool to assure that the travel plan decisions are carried out (40 CFR 1505.2(c) and 1505.3).

Under the monitoring protocols, the recreation department has been surveying and interviewing users across the forest. This study, national visitor use monitoring (NVUM), is conducted every five years, and has provided statistical information on the amount of use, type of use, and location of use across the forest. This effort is expected to continue.

Other tools to help the forest monitor the effectiveness of the travel management plan include field reconnaissance by ranger district and forest personnel including backcountry rangers, wilderness rangers, snow rangers, engineers, recreation managers, and any other forest personnel that are in the field. Citizens who report findings also help to identify issues that need to be remedied.

Law enforcement observations and database recordings will help identify problem issues and areas that need attention and/or corrective measures.

Implementation

The roads and trails that are to be part of the National Forest System will be designated through this plan. These roads and trails will need to be maintained, or in some cases brought up to standard, including those user-created routes that are added to the system. A plan for how, where, and when to implement work on the ground to reinforce the decision to decommission or rehabilitate roads and trails will be established by the White River National Forest. The forest will dedicate funding toward accomplishing the goals set in this plan. Additional site-specific analyses including biological and archeological clearances may be required to identify the best methods to be used for bringing roads and trails to standard or decommissioning and rehabilitation efforts. The additional analyses are not to revisit the decision as to whether the road or trail should exist or not, rather they will focus on the best methods meet resource needs.

The forest is updating its sign plan in concert with regional direction. The forest will continue to sign for travel management across the forest. The sign plan will help provide consistent sign usage across the forest. The forest is dedicating time and money to install educational, informational, and regulatory signing across the forest.

Travel use map(s) will be available for public distribution. Motor vehicle use maps, as required by the rule, will also be available for public distribution. Forest-wide travel order(s) and MVUM will be in place to provide the mechanism to enforce any strategies.

The forest will develop an enforcement strategy that will include a focus on public education. The forest hopes to create an environment where users are encouraged to follow the strategies outlined in the travel management plan by working with user groups and individuals, utilizing the internet, press releases, maps, and signs.

Law Enforcement

The forest at full staff has three full time law enforcement officers. These officers are supervised by a zone special agent. The forest also trains several of its field staff to serve as protection officers. Protection officers mainly can observe and write tickets for minor violations. Any major violation must be handled by the law enforcement officer.

The current travel management restrictions that govern the use of roads and trails are a complex mix of regulations, special closures, and a large number of seasonal restrictions. These are not easily displayed on a map or written document. The travel management plan will attempt to simplify some of this confusion by limiting the variety of seasonal

restrictions where possible, creating readable maps, utilizing the latest technology communication tools available on the web, posting information in key locations, and educating users.

Forest recreation professionals and law enforcement officers have noted enforcement hot spots and certain times of year where higher levels of violations occur. Law enforcement efforts will focus on areas of greatest concern or potential for resource damage.

The travel management plan final decision for site-specific use will consider ways to discourage illegal use. These considerations include developing networks that satisfy the intended use. This means that a road or trail that is too short or isolated to provide what the user is looking for or dead-ends where the use is not allowed, will likely not include that use on the route. This is just good network planning. The forest wants to provide what the user needs for a satisfying, quality experience. With a limited law enforcement staff, the ability to allow law enforcement to focus its efforts rather then spread the efforts on every acre makes their job more efficient and effective.

Also under the rule, driving off of designated routes for motorized use is considered a general prohibition. This means that the user is responsible for understanding and following the law, which also means knowing where he/she can or cannot ride or drive.

Implementation of the travel management plan will include a strategy for educating the user, utilizing law enforcement efficiently, and developing tools for communication to inform visitors of the forest.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in the alternatives chapter. This chapter presents the description of the affected environment, direct/indirect effects, and cumulative effects.

The Forest Service has inventoried and mapped all existing roads and trails for consideration under White River National Forest jurisdiction. These include forest roads and trails as well as user-created roads and trails. Sources for the update included previous inventories, Forest Service field managers, and information submitted by the public.

The mapping is based on U.S. Geological Survey (USGS) quad maps, USGS ortho-photos, project maps, and field verification. These maps were presented to the public during public meetings for further review and input. All roads and trails were identified by type and use. This mapping was entered into a geographic information system (GIS) program for analysis.

A series of assumptions were made concerning the effects of the travel management plan as it relates to the analyses. Those assumptions include:

- There will be no new road or trail construction as a result of any alternative;
- The only ground-disturbing activities resulting from implementation of the alternatives will be routine maintenance activities and decommissioning/rehabilitation of existing roads and trails;
- There will be changes to the category of uses among motorized, mechanized, and non-motorized/non-mechanized uses that will result in various levels of impacts across the forest;
- There will be two different types of physical impacts analyzed: (1) impacts related to the actual footprint of the road or trail, and (2) disturbance activities resulting from the use of the travelways; and
- Travelways identified for decommissioning/rehabilitation may take years to resemble surrounding habitats.

Air Resources

Introduction

Air pollution can affect human health, reduce visibility, and contribute to acidic deposition in sensitive, high-elevation lakes. Air quality on the forest is potentially affected by land management and development activities both on and off the forest. Potential impacts on air quality on the forest include regional haze caused by transported pollutants from large power plants located in the southwestern United States. Industrial sources nearer to the forest such as power plants, mines, and oil and gas extraction activities contribute to local and regional air pollution. Urbanization and resort development near the forest bring additional impacts on localized air pollution, such as wood-burning stoves and de-icing of winter roads. Wildfires are also an air quality concern when their smoke inundates communities and other sensitive areas.

Air pollutants related to travel management activities can include vehicle emissions and fine particulate matter created primarily by dust from vehicle travel over a dry and unpaved road surface.

Key Indicators

Key indicator: Visibility and concentrations of particulate matter.

Measure: This air quality analysis is qualitative and compares road miles and their corresponding risk of creating adverse air quality. Quantitative analysis is more meaningful at the project level.

Affected Environment

Air quality on the White River National Forest rates among the best in the country. No violations of ambient air quality standards have occurred on the forest, nor have any activities on the forest caused violations of these standards elsewhere. All areas of the White River National Forest currently meet air quality standards.

The Clean Air Act outlines different levels or classes of air quality protection. Class I or II areas include designated wilderness areas (of August 7, 1977) that are 5,000 acres or greater in size. These areas have the most stringent degree of protection from current and future air quality degradation. Under the Clean Air Act, the Forest Service has "…an affirmative responsibility to protect the air quality related values (including visibility)…" within a class I area it manages. There are three class I wilderness areas on the White River National Forest: Maroon Bells-Snowmass, Eagles Nest, and Flat Tops. Class II wilderness areas in Colorado are given similar air quality protection under the Colorado Clean Air Act. Class II wilderness areas on the forest include Collegiate Peaks, Hunter-Fryingpan, Raggeds, Holy Cross, and Ptarmigan Peak.

Vehicle emissions include nitrogen oxides, hydrocarbons, fine particulate matter, and carbon monoxide. Ozone, a secondary pollutant, forms from a combination of nitrogen oxides, hydrocarbons and sunlight. Fine particulate matter is often an issue with dry gravel-surfaced roads where vehicle travel often results in dust suspended in the air. Vehicle emissions and fine particulate matter stirred up by vehicle travel over unpaved road surfaces have not been identified as a major air quality issue on the White River National Forest.

Application of cinders and sand to surfaced roads to facilitate traction during icy conditions can result in significant dust once the roads dry out. The White River National Forest does not manage any roads that require de-icing.

Environmental Consequences

General, Direct, and Indirect Effects

Air quality impacts from vehicle emissions are influenced by the effectiveness of the smog control devices on cars, amount of traffic, and duration of engine idling. Quantitative analyses of road impacts on air emissions, visibility, and fine particulate matter are more appropriately applied to specific projects. The scope of this analysis is such that broad assumptions must be relied on to estimate impacts between alternatives. The assumption behind this analysis is that miles of open roads and motorized trails are directly proportional to their impacts on air quality.

Table 3.1 shows miles of each road and motorized trail type under each alternative, including all roads with some type of motorized use and trails with motorized use (including open to public, special use). The no action alternative would result in the greatest miles of open roads and motorized trails and, therefore, might result in greater annual vehicle emissions. Alternative G would result in the least number of motorized miles.

Table 3.1—Miles of road by alternative

	Alternative A	Alternative F	Alternative G
Level 2 roads (high clearance)	1605	1457	1224
Level 3 and 4 roads (passenger cars)	366	366	366
Level 5 roads (paved surface)	13	13	13
Motorized trails	152	160	198
Total	**2,136**	**1,996**	**1,801**

The impacts of road dust from unpaved roads and motorized trails depend on factors such as the amount of travel, size and speed of the vehicle, climatic conditions, and geology. This analysis focuses on roads and trails most likely to see regular dust entrainment. These include maintenance level 2 roads (unsurfaced, high clearance roads), level 3 and 4 roads that are often gravel surfaced, and motorized trails.

On the forest, road dust typically becomes an issue related to resource extraction activities when there is concentrated travel by large vehicles on unpaved roads. Examples of these activities include timber harvesting and oil and gas development, both of which require road access. These situations are remedied through project-specified mitigations, such as requiring the operator to manage dust by watering or other dust-abatement methods.

The assumption is that the greater the miles of road and trail, the greater the risk of entrained dust and impacts on nearby visibility. Table 3.2 displays the miles of unpaved forest roads (maintenance levels 2, 3 and 4) and forest motorized trails open to the public within the forest that would result under each alternative.

Table 3.2—Miles of road/motorized trail by alternative - dust

	Alternative A	Alternative F	Alternative G
Level 2 roads (high clearance)	1605	1457	1224
Level 3 and 4 roads (passenger cars)	366	366	366
Motorized trails	152	160	198
Total	**2,123**	**1,983**	**1,788**

Both action alternatives would reduce dust impacts from current available road travel on the White River National Forest. Alternative G would result in the least number of miles of unpaved travel surfaces on the forest.

Road impacts on air quality can be seen more at the local level, where sustained vehicle traffic creates dusty, low-visibility conditions on the road itself. Dust abatement can be applied to roads where chronic dusty conditions create a nuisance and potential safety issue. To date, no adverse impacts on overall air quality, visibility, or fine particulate matter in surrounding wilderness areas or population centers have occurred as a result of vehicle emissions or dust created by unpaved roads on National Forest System lands. Because no new road construction would occur under any alternative, it is unlikely that the selection of any alternative would change this situation.

In winter, snowmobile emissions are dispersed across thousands of acres across the forest. The numbers are low enough that their contribution cannot be measured at a forest-wide or even a regional scale. The effects are isolated, temporary occurrences. The emissions are considered at the level of an irritant to non-motorized winter recreationists. This mainly occurs where both non-motorized and motorized winter recreation activities directly overlap in high numbers. This effect occurs mostly at trailheads and shared trails. The effect occurs when the two meet for seconds to minutes.

Cumulative Effects

Cumulative actions considered include current and future oil and gas development (vehicle and industrial emissions), smoke from wildland fires, and regional and local growth resulting in additional air pollutants. All of these actions contribute to emissions of nitrogen oxides, carbon monoxide, volatile organic compounds, sulfur dioxide, and particulate matter. Recent analysis of proposed natural gas development in the Alkali Creek area on the Rifle District disclosed cumulative impacts on class I visibility in all three wilderness areas on the WRNF. The primary source of visibility impacts is from major upwind industrial sources (Hell's Gulch EA 2008).

Although vehicular travel on unpaved roads can be heavy during resource management activities such as timber harvest, mining, and oil and gas development, these activities are typically regulated by local, state and/or federal agencies that require dust abatement measures to mitigate the air quality impacts of sustained and heavy traffic use.

Implementation of any alternative, including the no action alternative, would not cumulatively create any measurable effects across the forest. No decision within the range of those considered in this analysis can be differentiated in terms of cumulative air impact. There are no unavoidable adverse, irreversible or irretrievable effects on air quality as a result of any alternative.

Domestic Livestock Grazing

Introduction

Domestic livestock grazing is a historical use on the White River National Forest. Grazing is managed under the grazing permit system. Permits specify permittee responsibilities for maintenance of range improvements and salting necessary for the management of livestock while on the forest. Improvements include fences, water developments, ponds, and corrals. Access to these improvements is critical for proper management of the allotment. Access by grazing permittees varies from motorized to non-motorized use. Periodic motorized access is needed. Access that is exclusive to the permittee should be authorized in the grazing permit, allotment management plan, or annual operating instructions. Numerous trails exist to facilitate proper distribution of livestock within allotments. These trails are maintained by the grazing permittee and are considered range features; therefore, they are not included as features in the transportation system.

Key Indicators

Key indicator: Potential conflict between livestock and recreationists.

Measure: Miles of road and trail within active allotments.

Key indicators: Increase in forage production.

Measure: Miles of road proposed for decommissioning within active allotments.

Affected Environment

The forest supports numerous viable livestock operations. Approximately 44 percent of the forest is within active allotments. Localized urbanization, increases in property values, and the complexities of managing livestock in areas with high recreation use have led to a decline in the desirability and feasibility of some allotments for livestock production. Many roads and trails that are used by people are also used to facilitate management of livestock and forage resources. Some roads and trails that cross allotments can lead to conflicts between livestock and recreation users. People's presence can disturb livestock, and livestock can make roads and trails rough.

Environmental Consequences

General Effects

Impacts are allotment-specific and depend on the individual operation and the designation placed on roads within those allotments. Some allotments have extensive road systems, while some are more remote; some operations depend on motorized travel, while some use non-motorized methods, such as horses.

Management of the transportation system can have both positive and negative impacts on livestock grazing. While roads and trails facilitate the movement of livestock and provide access to range improvements for construction and maintenance, roads and trails also can remove natural barriers; create livestock drift problems; and increase the need for additional fences, gates, and cattle guards. Heavy recreational use of roads and trails, both motorized and non-motorized, can disrupt livestock distribution. Gates frequently are left open and cattle drift from desired locations. Conflicts between recreation use and

livestock cause livestock to move into areas that might not be the desired area for grazing, which can result in over-use of forage in some areas.

Acreage occupied by existing roads and trails is eliminated from forage production. The obliteration, recontouring, and revegetation of roads can return those areas to a forage-producing level.

Direct and Indirect Effects

Direct and indirect effects on domestic livestock grazing were estimated by analyzing the miles of roads and trails open or closed to the public. Table 3.3 presents miles of roads and trails open to the public within active grazing allotments. Table 3.4 presents miles of roads and trails within active grazing allotments that are planned for decommissioning.

Table 3.3—Miles of roads and trails open to the public within active grazing allotments on the White River National Forest

	Alternative A	Alternative F	Alternative G
Miles of open motorized roads and trails within active grazing allotments	1,255	1,255	1,058
Miles of open mechanized trails	365	362	202
Miles of open foot/horse trails	553	556	646

Table 3.4—Miles of roads and trails to be decommissioned within active grazing allotments on the White River National Forest

	Alternative A	Alternative F	Alternative G
Miles decommissioned routes within active grazing allotments	0	427	656

These tables demonstrate that Alternative G will have less motorized activity, but possibly more foot and horse activity, within active allotments. When comparing the effects of the alternatives with regard to road and trail decommissioning on forest-wide forage production, the differences among alternatives are insignificant in relation to the 1,300,000 acres within active allotments. Once a road or trail is decommissioned, motorized access by the grazing permittee, as well as the general public, on that road would be prohibited. Roads that are closed to the public but available for permittee operations under the authority of the grazing permit would have little to no impact on the grazing permittee's operation.

The impacts of travel management on livestock grazing can be both positive and negative. The more miles of roads and trails that exist on an allotment, the easier the access is for livestock management, yet the higher the potential for conflict with recreational users. The conflict between recreation and livestock management may even become more pronounced as more and more recreation users visit the forest. Conflicts with other users or loss of accessibility due to road decommissioning usually result in increased labor cost to managing livestock.

Cumulative Effects

The White River National Forest has one of the largest number of allotments in the region. The ability to graze on forest lands helps to keep the livestock industry viable and contributes to the overall economy of the area. Tourism and recreation in the area are increasing in great numbers as well. Conflicts over the same land base can occur. The travel system can help not only to access the allotments, but also to direct people through or around allotments. Other conflicts may occur when timber production or natural gas production creates roads in allotment areas.

Fire Management

Introduction

Fire management on the forest includes reaction to wildland fire situations and a prescribed fire program. Each wildland fire ignition is managed with an appropriate suppression response. Decisions are made to provide the suppression alternative that results in the least safety risk, least cost, and least loss of resources. Prescribed fire and fuels reduction are used to reduce the potential risk of severe wildfires.

Key Indicators

Key indicator: The ability to access land for fire management.

Affected Environment

The forest plan permits the responsible line officer to select an appropriate suppression response to wildfire starts in many areas of the forest based on management considerations. Aggressive initial attack is commonly used where there is an imminent threat to public safety and/or improvements on private lands. The range of available alternatives for an appropriate suppression response is influenced by factors such as land management objectives and the proximity to the wildland-urban interface. The determination of the appropriate suppression response for a specific wildfire considers firefighter and public safety, the potential for resource damage, and projected suppression costs.

Many designated wilderness areas, as well as non-wilderness areas on the forest, have an option to manage natural ignitions (lightning) as wildland fire use incidents. Wildland fire use involves the management of a lightning-caused fire during a long period of time to mimic as closely as possible the role of fire in the ecosystem. The fire is managed using pre-determined prescriptive parameters; prescribed management actions are identified as the fire perimeter hits trigger points during the course of the incident.

Environmental Consequences

General, Direct, and Indirect Effects

The road system on the forest can assist with the decision about which fire suppression resources are mobilized for a wildfire. Where roads are present, suppression resources such as engines and hand squads are used. Conversely, helitack and smokejumpers respond to backcountry wildfire incidents where roads are not present. In some cases, temporary roads can be built during response to a wildfire.

The presence or absence of roads can affect the range of alternatives considered to treat hazardous fuels profiles. The use of mechanized equipment to treat natural fuel accumulations generally requires road access to the project area. Similarly, road access improves the efficiency of holding resources during prescribed burning operations by permitting access for engines. There is not a direct correlation between project cost per unit area to accomplish fuels treatments and the presence or absence of roads.

Regardless of alternative, the number of acres available for fire management activities would remain constant. The alternatives may vary slightly in which resources are used for a particular wildfire, but those differences are too speculative to analyze.

None of the alternatives in the travel management plan would prevent the use of aviation assets, off-road vehicles, or the use of heavy equipment as necessary to initiate the appropriate suppression response for a wildfire. Therefore, no alternative would create inaccessible areas on the forest.

Alternative G proposes fewer roads than existing conditions. The forest plan also calls for the decommissioning of roads across the forest over the life of the plan. Although population is expected to grow in the wildland-urban interface zones across the forest, the effects on fire suppression activities cannot be predicted. Although the forest road system may influence the type of suppression activities, it will not affect the number of acres of forest available for fire suppression activity.

Cumulative Effects

This cumulative analysis considers historical fire data on the forest and the influence of road access. It considers the likelihood of effects of the road system on future wildland fires. It also considers the likely increase in population of the surrounding communities.

Statistics show that lightning naturally causes most fire ignitions in this region. The second most common fire start is human-caused. As population increases into an area, it may be assumed that there would be a higher chance of wildland fire; however, several other factors must be taken into account. Fires that are started by humans are individual instances and cannot be predicted. Factors in these circumstances also include weather conditions and fuel conditions.

Implementation of any of the alternatives would not have any cumulative effects on fire suppression.

Heritage Resource Management/Tribal Interests

Introduction

Road access can negatively affect heritage resources because roads provide access to discovery and unmanaged exploration of sites. This access is perceived as a link to potential vandalism or destruction of heritage resources and values. It has been stated with regard to vandalism that the "closing of trails and roads, and erection of physical barriers have proven to be the most effective deterrents to date" (Nickens 1992).

Conversely, ease of access can be viewed as a means for education about and interpretation of sites and the stories they tell, where these uses are allowed or encouraged.

Key Indicators

Key indicator: Ability to access sites and special use areas by Ute tribal members to practice traditional uses.

Measure: Routes decommissioned that were traditionally used to access sacred sites.

Key indicator: Ability to appropriately access interpretive sites for public use.

Measure: Number of interpretive sites available for public use.

Key indicator: Number of sites and special-use areas protected through management activities such as limiting, altering, or closing access.

Measure: Number of sites or special-use areas with increased or decreased access and type of access.

Affected Environment

At present, there are more than 2,300 known heritage resources on the White River National Forest. These resources vary from small campsites and large habitation areas to special places that may include an entire landscape. They include the remains and records of the past that are at least 50 years old; as well as sites, places, and values of cultural, religious, or traditional importance.

These resources are important for their potential to provide an understanding of long-term human adaptation to the environment and their presence on the landscape. They also have the potential to yield information regarding patterns of history and culture. Such cultural resources are recorded as "historic properties" or "historic resources." They include any prehistoric or historic district; cultural landscape; or traditional cultural property or value, site, building, structure, or object listed in or eligible for inclusion in the National Register of Historic Places (NRHP).

These resources are non-renewable and tell of life-ways and life-styles that reflect thousands of years of unique and successful adaptation to the high elevations of the Rocky Mountains. Federal laws mandate, and the forest plan allows for, the management and use of heritage resources and special-use areas as well as the protection of these resources.

Environmental Consequences

General Effects

The ability to protect heritage resources and special-use areas within the forest is influenced by the road system. Thus, a reduction or increase in capacity could have a positive or negative effect.

A disadvantage of an extensive road and trail system with regard to heritage resource management and special-use areas is the increased chance of vandalism and destruction of heritage values by humans. Statistically, the more access humans have to an area, the greater the amount of irreversible and irretrievable damage that can occur to heritage resources, including tribal special-use areas.

Direct and Indirect Effects

Road use and maintenance inevitably affect sites either directly or indirectly. Examples of direct effects are ground disturbance of surface and sub-surface deposits that would have otherwise remained intact. Indirect effects can be due to erosion from road surfaces that expose site deposits or cover them up, preventing future discovery or management. Other indirect effects include increased visitation leading to vandalism, collection, destruction, and/or erosion. In addition, the dumping and intermixing of intrusive modern debris on sites due to maintenance and use is also considered an impact.

The heritage staff of the White River National Forest analyzed all alternatives proposed in this travel management plan within areas of concern that were known to contain a high density of heritage resources or traditional Ute special areas. The *Heritage Specialist Report* is the documentation of this analysis and is proprietary information kept in locked files under the provisions of the Archaeological Resources Protection Act.

For direct effects, the study focused on those roads and trails where an increase in use is proposed and where potential ground-disturbing closures are proposed (Table 3.5).

Table 3.5—Miles of roads and trails where a change in use is proposed on the White River National Forest

	Alternative A	Alternative F	Alternative G
New routes planned for construction	None	None	None
Non-system routes that are to be authorized	None	None	280
Currently authorized routes planned for closure	None	None	512
Non-system routes to be rehabilitated	None	960*	690*
Routes planned for upgrade to motorized use	None	None	290
Changes to current road prisms such as new bridges and reroutes	None	None	None

**Does not include routes that were considered already decommissioned/removed from system.*

In general, most of the actions proposed in the alternatives examined in this analysis appear to have low potential for direct effects on the integrity of any known heritage resources. Potential direct effects on heritage resources will be addressed at the project level. For example, if a road is proposed to be decommissioned or rehabilitated, a heritage inventory will be conducted and mitigation measures will be developed as needed based on the methods used to conduct closure.

Compared to existing conditions, Alternatives F and G would present a better situation for the protection of heritage sites because of the overall reduction of roads and trails

through decommissioning and the classification of system routes (Table 3.6). Based on comparison of the number of miles of roads and trails, the types of use, and the locations thereof, Alternative G would provide for the most protection of heritage resources. Alternative F was ranked second, and Alternative A was determined to be the least desirable from a heritage resource point of view.

Table 3.6—Sites directly affected by alternatives on the White River National Forest

Site	Alternative A	Alternative F	Alternative G
5GF3181 impacts by FSR 804.1	Currently open to high clearance vehicles	Open to licensed and unlicensed vehicles	Closed to the public
5EA1519 impacts by FSR 734.1	Currently open to licensed and unlicensed vehicles	Same as A	Open to all uses but ATV, motorcycle
5GF2844 impacts by way N7907.1	Way is closed	Way is closed	Way is authorized for motor vehicles < 50” wide
5GF2874 impacts by way 601.4D	Way is closed	Way is closed	Way is closed
Baylor Park area sites Pipeline road 300.1P	Open to mtn bikes, animal, hiking	Open to mtn bikes, animal, hiking	Open to animal, hiking only
5GF2842 impacts by 1854.1	Currently open to mtn bikes, animal, hiking	Open to motorcycles, mtn bikes, animal and hiking	Open to animal, hiking only
5GF2875 impacts by 634.1	Currently open to licensed and unlicensed vehicles	Same as A	Closed to the public
5RT2298 impacts by 2034.1	Currently open to mtn bikes, animal, hiking	Same as A	Open to animal, hiking only
5EA197 Camp Hale	Currently open to licensed and unlicensed vehicles	Closed to the public	Closed to the public

The preferred alternative, Alternative G, proposes to authorize a way through historic property 5GF2844. Currently, there exists a spider web network of unauthorized ATV routes through this property. Establishing one route through the property will limit the unauthorized uses.

Alternative G proposes to reduce the motorized use of a route that bisects historic property 5EA1519. However, this may not adequately address the protection needs of this property. A site-specific protection plan should be developed for this property.

All alternatives would maintain access to interpretive sites. The travel management plan provides the basis from which interpretive site plans can be developed, where access can be specified and controlled.

Many prehistoric Ute nation sites are found on the forest. These sites relate to their history and traditions. Some of these sites are sacred and carry a special meaning to the Ute tribe. Access to these sites by tribe members can be accommodated on open roads and trails or through special-use permit when necessary.

Cumulative Effects

Trends during the past decade saw increased usage of National Forest System lands near urban centers or along transportation corridors such as I-70 that adversely affected sites and/or cultural landscapes. Designated roads or trails have taken visitors to formerly inaccessible areas. Higher numbers of skiers and snowmobiles mean that more people can access historic sites such as old buildings. The result is that sites once protected by their very isolation have more potential to become damaged or vandalized because of increased access. Networks of trails adversely affect heritage resources by altering the cultural landscape through fragmentation of traditional cultural properties. Segmentation of historic routes (such as ancient Indian trials, wagon, and stage roads) causes loss of data and site integrity, and these effects multiply with increased use. Increasing use produces increasing damage, with the ultimate effect being loss of educational and interpretive values.

The expected increases in population along the I-70 corridor will likely mean an increase in recreation use on the forest. New technology has extended human access into previously remote areas in increasing numbers. The designation of any action alternative as the travel plan for the White River National Forest would reduce the potential for access to heritage sites from the existing condition. This reduction, the concentration of use into those available areas rather than dispersed use across the forest, and forest plan direction to continue to decommission unnecessary system roads would not create any measurable cumulative effects on heritage resources.

Minerals

Introduction

By virtue of their geology and geomorphology, national forests are a principal storehouse of the nation's mineral and energy resources. The search for and development of these resources are legally mandated uses of National Forest System lands, except for lands formally withdrawn by acts of Congress or by executive authority.

On a federal mineral lease, the lessee has a vested right to develop the mineral resource, subject to lease terms and any stipulations that may be attached to the lease. For oil and gas development, the Forest Service reviews, approves, and administers the surface use plan of operations (SUPO), a part of the application for a permit to drill (APD). The Bureau of Land Management (BLM) administers and approves the drilling operations.

The White River National Forest contains leasable, locatable, and salable minerals. The Forest Service cooperates with BLM to manage these resources. The forest plan provides goals, objectives, standards, and guidelines for management of these resources.

Key Indicators

Key indicator: Land available for locatable mineral entry and/or minerals leasing.

Affected Environment

Leasable Minerals

Federally owned leasable minerals include fossil fuels (such as coal, oil, gas, and oil shale), geothermal resources, phosphates, sulfur, and uranium. These minerals are subject to exploration and development under leases, permits, or licenses granted by the Secretary of the Interior, with Forest Service consent or consultation. At this time none of the following mineral resources are leased: coal, geothermal, phosphates, sulfur, and uranium. The only leasable minerals presently leased on the White River National Forest are oil and gas.

In 1993, forest staff completed the Oil and Gas Leasing EIS (USDA Forest Service/WRNF 1993). A record of decision (ROD) was approved on May 26, 1993. This is a forest-wide decision and it is currently in effect. The forest plan incorporated the oil and gas leasing decision; however, a few adjustments were made as result of forest plan direction. Decisions based on that analysis include designation of lands available for leasing, and stipulations on available lands. This information is incorporated by reference.

Mineral leasing activities will continue to comply with direction in the forest plan. At the time this document was prepared, most available lands within the planning area with known potential had already been leased.

Locatable Minerals

Locatable minerals are those valuable deposits subject to exploration and development under the General Mining Law of 1872 and its amendments. These resources are commonly referred to as “hardrock” minerals and include gold, silver, molybdenum, iron, copper, zinc, lead, and alabaster.

Lands open to operations under the General Mining Law include all areas of the national forests except those formally withdrawn from mineral entry either by Congress or the Secretary of the Interior or otherwise exempted. On the White River National Forest, approximately 80 percent (750,000 acres) of the existing withdrawals are in designated wilderness areas. The remainder is associated with developed recreation and administrative sites. The Forest Service requests withdrawals through the BLM when necessary to protect capital investments, unique natural features, or management options.

The only ongoing operation on the forest is an alabaster and marble mine near Redstone. Each year, the forest authorizes six to eight small, short-term operations for various mineral resources.

Locatable mineral potential does exist on the forest. Assessment of its potential can be found in the following documents: Mineral Resource Potential and Geology of the White River National Forest and the Dillon Ranger District of the Arapaho National Forest, Colorado (Toth et al.1993) and Regional Mineral Appraisal of the Leadville 2 Degree Quadrangle Colorado (USDI Bureau of Mines 1993). These reports identify levels of high, moderate, and low potential for locatable, leasable, and salable (other than building stone) minerals on the forest and include maps showing locations of this potential.

The forest plan included decisions by management area where locatable mineral exploration and development are allowed (USDA Forest Service/WRNF 2002a).

Salable Minerals

Salable minerals, or common varieties, generally are found as deposits of sand, clay, gravel, and stone that provide materials for construction and road surfacing. Disposal of these minerals is by mineral material permit or contract at the discretion of the Forest Service. Decisions to issue permits for salable mineral will be made on a case-by-case basis.

Environmental Consequences

General Effects

Leasable mineral interests are entitled to reasonable access to and use of the surface under the forest plan and appropriate mineral development regulations, unless specifically limited by the terms of their lease, permit, or plan. Restrictions, designations, and prohibitions developed through the travel management plan will not limit vehicular access for leasable mineral exploration and/or development conducted according to the terms of an approved permit, notice, plan, lease, contract, or other authorization.

The travel management plan will not affect the access to, quantity of, or quality of locatable minerals. Management areas are either available for mineral entry or not available for entry based on the forest plan.

Leasable, locatable, and salable minerals project proposals will continue to be evaluated on a site-specific basis.

Direct and Indirect Effects

There would be no direct or indirect effects on leasable, locatable, or salable mineral resources resulting from implementation of the travel management plan. Authorizations for access, development, and exploration for mineral resources would continue to occur in accordance with the forest plan, Oil and Gas Leasing EIS and ROD, applicable mineral

exploration and development regulations, and any special terms and conditions attached to the lease or permit.

Because of the demand for clean-burning fuels, an increase in exploration, leasing, and development of oil and gas resources can be expected (see appendix C of the Oil and Gas Leasing EIS). During the years 2003 through 2008, the White River National Forest and adjacent BLM lands have seen a sharp increase in leasable minerals project proposals.

Locatable mineral uses on the forest are expected to remain at current levels. Generally, exploration and development will be associated with a dramatic increase in price. However, because of the potential reserves yet to be developed on the forest, we can expect that development will occur eventually in those areas of moderate to high potential.

The public demand for sand and gravel can and will be met primarily on private lands. Sand and gravel deposits on the forest will primarily be used by the Forest Service and its contractors for surfacing National Forest System transportation routes and recreation areas. Public demand for building stone from the White River National Forest is high, and demand for topsoil is low to moderate.

Cumulative Effects

Energy and mineral resources have been numerous and accessible enough to provide a viable industry with opportunities for development for more than 100 years. Present reserves will continue to provide opportunities well beyond the next planning cycle. Since mineral and energy resources are fixed both geographically and geologically, impacts are generally associated with management prescriptions and standards that prohibit development. The more acres removed (leasable—administratively, unavailable; locatable—withdrawn) from mineral development, the more long-term impacts on the mineral resources in use. It should be noted however, that lands that are already leased or that have mineral claims will retain their rights based on the conditions that were made at the time of lease or permit.

Since the travel management plan does not propose to remove additional acres from mineral development, no cumulative effects on mineral resources are expected from its implementation.

While the travel management plan does not affect lands that may be leased or developed, the development of leases can effect travel management and associated experiences. In areas that have a high potential for development, currently the area south of Rifle, a network of specialized roads may be necessary. Also, current roads on the system may need to be upgraded for the type of traffic necessary for natural gas production. The decisions for additional roads are made under the National Environmental Policy Act (NEPA) required for well development. It is within these documents that the effects to the travel system and forest are analyzed.

Authorizations for access, development, and exploration for mineral resources will continue to occur in accordance with the forest plan, applicable locatable mineral exploration and development laws and regulations, and any special terms and conditions attached to the lease or permit.

Noxious Weeds

Introduction

Noxious weeds are defined as alien plants that aggressively invade or are detrimental to native plant communities. Exotic plants introduced from other parts of the world arrive without their natural enemies (insects and disease) to keep them in check. This helps give them a selective advantage in competition with native vegetation.

Once established, the spread of noxious weeds becomes responsible for the reduction of biodiversity by crowding out native plants; the displacement of wildlife that depend on these native plants; and the disruption of watershed function, soil chemistry, nutrient flow, and energy flow. Left unchecked, noxious weeds can pose a significant threat to ecosystem health.

Weed seed is transported on roads and trails by motorized as well as non-motorized means. Humans, vehicles, equipment, horses, livestock, wildlife, wind, and water spread noxious weed seed. Roads and trails provide corridors for the spread of noxious weeds from adjacent areas. Soil disturbances associated with the maintenance and decommissioning of roads and trails create potential habitat for their invasions. Evaluations are done at the project level to include appropriate prevention and mitigation measures for weed control. However, once established, the weeds can spread to adjacent undisturbed habitat types.

Key Indicators

Key indicator: Habitat available to noxious weed infestation.

Measure: Total miles of roads and trails by alternative.

Key indicator: Currently accessible weed habitat made unavailable to new infestations.

Measure: Total miles of road and trail by alternative to be decommissioned.

Affected Environment

Presently it is estimated that 89,000 acres are infested with noxious weeds on the White River National Forest. Forty species of noxious weeds are known to occur on the forest and eight are known to be adjacent.

Noxious weeds can be expected to occur in higher densities along roadways, in areas disturbed by timber harvests, campgrounds, recreation trails, trailheads, livestock, utility corridors, gas lines, and ditches; however, they are also known to invade otherwise healthy, undisturbed plant communities.

Through risk assessment of noxious weed introduction and spread for proposed projects or activities, appropriate prevention and mitigation measures are implemented. Soil disturbances associated with the maintenance and decommissioning of roads and trails are actions that require evaluation and appropriate management practices implemented at the site-specific level.

Environmental Consequences

Direct and Indirect Effects

This analysis used road and trail information in each alternative to assess the relative risk of spreading noxious weeds (table 3.7). For overall potential spread, this analysis based that risk on the extent of public use of roads and trails: the more roads and trails that are open for use, the greater the potential for noxious weed spread.

The decommissioning of roads reduces the potential for the dispersal of seed by motorized vehicles; however, earth disturbance associated with certain decommissioning methods can create habitat for noxious weeds to get established. The decommissioning of roads without revegetation reduces the movement of seed but does little to reduce the available habitat or prevent establishment once seed enters the area. The early treatment and revegetation of these roads and trails can reduce the risk of noxious weed establishment by stabilizing the site and providing competition.

Table 3.7—Measures for comparing potential for noxious weed spread due to roads and trails

	Alternative A	Alternative F	Alternative G
Miles of open public roads and trails	3,970	3,972	3,681
Miles of road and trail to be decommissioned or rehabilitated	0	1,251	1,485

Alternatives A and F would have the most miles of road and trail open to the public and the highest levels of road and trail maintenance. Alternative A would also leave the most roads and trails, though not part of the system, still left untreated. Therefore, this alternative has the greatest potential for spreading noxious weeds through earth-disturbing activities and dispersal of weed seed. When comparing open miles of roads and trails along with roads and trails to be rehabilitated, on the whole, alternative G would have the least amount followed by alternative F. The no action alternative would be the least effective alternative.

The selection of any alternative that would reduce available weed habitat, the concentration of use rather than dispersed use across the forest, and forest plan direction to continue to decommission unnecessary system roads would help reduce the spread of noxious weeds.

Cumulative Effects

The transportation system provides a vector for dispersal of noxious weed seed. Increased population growth in adjoining communities and recreation use on the forest has the potential to increase weed infestation risk. This potential, in combination with other earth-disturbing activities, will continue to provide conditions that allow for an increase of noxious weed infestations on the forest.

Cooperation between the Forest Service, other federal land agencies, counties, towns, and private citizens to recognize and reduce the introduction and spread of weeds on both private and public lands is necessary to combat the spread of noxious weeds.

Recreation Management

Introduction

With well over 9.6 million annual visits to forest recreation facilities, the White River National Forest is the most visited national forest in the nation, by more than 50 percent above the next highest visited unit (*2002 National Visitor Use Monitoring Survey* [Kocis et al. 2003]) and receives more annual visitors than any national park. People who visit the forest for scenic drives account for an additional 11 million visits annually.

The eastern boundary of the White River National Forest is less than 60 miles from the Denver metropolitan area. Interstate 70 (I-70) bisects the forest and provides quick and easy access from the Denver area and for traffic movement within the forest itself. Traffic through the Eisenhower/Johnson tunnel increased 45 percent between 1991 and 2002 (CDPOR 2003). People visiting the forest may arrive by plane from any of four commercial airports, by train, by commercial tour bus, and by auto travel.

The White River National Forest has long been considered a primary recreation destination in the winter because of its world-class ski resorts. However, more recently, the primary recreation growth now occurs in the non-downhill skiing activities during the winter and in many of the summer activities (USDA Forest Service/WRNF 2002b).

Most visitor use originates from locations outside the forest. The demographic breakout shows 36 percent of forest visits are from communities within the forest, 30 percent are from Colorado Front Range communities, 3 percent are from other locations in Colorado, 8 percent are from Texas and southwestern United States, and 12 percent are from the Midwest. The remaining 11 percent of visitors come from other locations including 3 percent from international locations (Kocis et al. 2003).

Visitor use continues to grow in both the number of potential activities and the number of people participating in each activity. As visitor use growth occurs, personal expectations about the quality of experience can cause increased conflicts among user groups.

If one generalization can be made from the body of knowledge about recreationists, it is that people vary enormously in what they desire from their recreational pursuits. (ROS, p. III-8) Diversity represents an important characteristic of any recreation system. Managing opportunities for recreation to promote a diversity of experiences is crucial for social equity (Watt 1972, from p. III-9 ROS). But diversity is only a means to an end. Quality recreation, producing desired satisfaction and benefits for participants, is the objective and concern of both managers and recreationists (ROS, p. III-9).

Trail and Road System

While there are some exceptions, such as the Ute Trail and the adoption of old stock driveways, the forest's trail system was largely created for foot and horse use and access. Many trails were adoptions of user-created trails accessing popular areas and attractions. Likely, the most concentrated effort to actually construct recreational trails was during the Civilian Conservation Corps (CCC) era.

Trail design needs are different for mountain bikes, motorcycles, and ATV's. Where these uses are allowed, the users have tried to adapt to trails built for hikers and horses. In very few cases, the Forest Service has reconstructed and upgraded trails to accommodate these uses. More often, these users have created their own trail systems because the Forest Service system did not meet their desires.

Nearly all of the forest's road system was created either for timber removal, mining, or for transporting the public through the forest to another destination. Thus, this system is also less than ideal for the primary purpose of today's recreation needs. Trying to satisfy some motorized and mechanized users and keep them on the existing system has become a management challenge.

The ability for the visiting public to move around within the forest is key to the many recreation activities available. Most resource-based recreation occurring in the U.S. occurs within ½-mile of the transportation system (Cordell and Bergstrom 1989). For some activities, such as mountain biking and snowmobiling, both the travel capability of the vehicle and the activity itself are principal components of the recreational experience. Visitors are not only using vehicles for the traditional use of transportation from one point to another; the activity of operating the vehicle in a forested setting also becomes a part of the recreational experience. In many circumstances, the desired recreation experience itself may be the travel activity in a forest setting. In other circumstances, the forest is where people come to participate in an activity because the forest is a convenient venue for the activity or because the activity is not provided on private lands; in these cases the enjoyment of the activity is not dependent on a forest setting.

Evolution of Recreational Travel Management

Travel restrictions of varying degrees have been in place on the White River National Forest since the 1950s. In 1978, the forest published its first travel management map outlining area travel strategies. The map was typically updated annually.

In 1984, the forest completed its first forest plan as mandated by the National Forest Management Act. The following year the forest published what is our most current travel management map to reflect decisions made in the 1984 forest plan. In 1985, a forest supervisor's order was signed to implement decisions in the 1984 plan. The primary focus of the 1985 supervisor's order was a designated routes policy for motorized use during the snow-free period. There were very few areas in summer where motorized use was allowed off designated routes. In the 1984 forest plan and subsequent 1985 travel management map, there were very few restrictions to mountain bike, horse, and foot travel other than a prohibition against mountain bicycles in designated wilderness.

The winter travel strategy differed from summer in that it was more of an open travel policy. Winter motorized use was allowed to go anywhere except in areas such as congressionally designated wilderness, on downhill ski areas, or in wildlife winter range. The large area of the forest that appeared to be open to winter motorized use was not usable, from a practical standpoint, due to topographic limitations, dense vegetation, and limited capabilities of the machines themselves.

The 2002 forest plan revision made some programmatic changes to travel management. In the summer, the changes primarily affected mountain bike use. A decision was made to restrict mountain bike and other mechanized uses to designated roads and trails only. Although this decision only affects a small proportion of the total mountain bike use, it addresses the issue of user-created mountain bike trails. The forest plan also requires all motorized use to stay on designated routes, which resulted in elimination the few areas of off-road and trail motorized travel that remained from the 1984 plan.

For winter travel, the forest plan allocated more of the non-wilderness land base into management areas that contain strategies focusing on wildlife concerns and non-motorized recreation. The forest plan also calls for designation of winter routes and play areas for certain management area strategies. For example, in the areas designated 5.5 forested landscape linkages, which include a total of 83,500 acres across the forest,

winter travel is now restricted to designated routes and play areas. Winter motorized travel in wildlife winter range, in particular management area prescriptions 5.41, 5.42 and some of 5.43, continues to be restricted to designated routes and play areas only. Some previously "open to motorized use" areas were changed to "non-motorized" because of physical resource limitations such as steep terrain and dense timber that prevented motorized use from occurring. The forest plan showed a drop in total available acreage for winter motorized use from 1,197,000 acres to 941,000 acres. Much of the change came about due to better mapping capability and removal of extremely steep slopes or locations inaccessible to motorized use from the motorized acreage inventory. A limited number of those areas that were changed to non-motorized use in the forest plan revision were actually being used for winter motorized use. A few of the changes remain controversial with some forest users.

Incorporating December 2005 National Motorized Travel Regulations

In December of 2005, the Forest Service published a new national travel management regulation, Travel Management: Designated Routes and Areas for Motor Vehicle Use (the travel rule) relating to designated routes and areas for motor vehicle use. This rule is part of a larger effort to get a handle on the detrimental effects of unmanaged recreational motorized use and to better focus on providing high quality recreational opportunities for the motorized users in appropriate locations. The direction in the travel rule focused primarily on summer motorized off-highway vehicle (OHV) use. Much of the direction in the travel rule, such as requiring a system of designated roads, trails, and areas, has already been implemented by previous forest decisions.

There are, however, some requirements in the travel rule that necessitate changes on the part of the forest to come into compliance. The forest has updated this document to further incorporate direction in the travel rule into this second version of the draft environmental impact statement and draft travel management plan.

The travel management plan is one component to help achieve the objectives of the travel rule. Other components of the travel rule will be implemented by the forest as directed in the regulations provided in the rule. The travel management plan for the White River National Forest not only incorporates direction from the travel rule, but also sets direction for all travel to meet forest plan direction and management goals.

Motorized Mixed Use on Roadways

The new national motorized travel management rule requires the forest to designate motor vehicle use by vehicle class, and if appropriate, time of year (CFR 212.51). The travel rule also requires the responsible official to consider effects on National Forest System natural and cultural resources; public safety; provision of recreational opportunities; access needs; conflicts among uses of National Forest System lands; the need for maintenance and administration of roads, trails, and areas that would arise if the uses under consideration are designated; and the availability of resources for that maintenance and administration (36 CFR 212.55). The forest plan already encourages the forest to emphasize public safety in the development and use of the travel system. (USDA Forest Service/WRNF 2002a, p. 2-37)

The forest is currently managing the transportation system based on decisions in the 1984 forest plan, the subsequent 1985 Forest Supervisor's closure order, and addendums to the order based on more recent decisions. The 1985 order did not differentiate between the types of motorized vehicles on roads. This distinction was not an issue at the time because there were still very few non-highway legal motorized vehicles and drivers using the forest. As the use of ATVs and similar vehicles began to grow, the Forest Service

took a position that these were a legitimate use of some routes and locations on the national forests.

All motorized use was managed under a hierarchical system. In this system the forest maintained a roadway for the highest level of motorized use, such as passenger cars, and then, by default, all other motorized and non-motorized uses were automatically allowed on that roadway. No analysis of whether mixing all of these uses was safe or appropriate was done. Nor were any other factors really considered, such as the quality of the recreational experience, potential for user conflicts, or whether the user could legally get to the road on other roads also legally open to that use. The route was simply open for use by all motorized travel. Only in cases where serious safety problems had been identified would the forest consider restricting certain uses.

This system placed a burden on all users of the roadways to understand they could encounter a variety of uses on the roads at any time. It was up to the user to know and obey state traffic laws pertaining to their use.

This system worked adequately when use levels were lower and almost all drivers were old enough to understand all of the implications of driving on public roadways. Circumstances have changed significantly since 1985. Between 1995 and 2003, off-highway vehicle registrations in Colorado have risen by 223 percent, or an average of 18 percent annually (SCORP, p. 15). Recreation use outside downhill skiing doubled between 1992 and 2002 on the forest. (Data on the increase between 2002 and 2007 is not yet available at the printing of this draft document. That data will be incorporated into the final document if available.)

The travel rule specifies many factors when considering whether to allow mixed use on a road. One key factor is safety. Mixed use is defined as authorizing highway legal and non-highway legal motorized vehicles to use the same road. For Colorado, that equates to licensed and unlicensed vehicles. Under the travel rule, the responsible official is required to make independent decisions on the safety of each motorized use on each of these routes. Several studies were conducted in the summers of 2006 and 2007 based on Forest Service manual direction to assist the responsible official in making informed decisions on vehicular use. Considerations in the studies included "(1) Speed, volume, composition, and distribution of traffic on roads; and (2) Compatibility of vehicle class with road geometry and road surfacing"(36 CFR 212.55(c)).

The initial focus for the White River National Forest was on the maintenance level 3, 4 and 5 roadways where forest staff had identified that there may be some safety concerns. Either all, or parts, of several roadways across the forest were determined to be unsafe for mixed motorized use. On routes that were determined not to be safe for mixed motorized vehicle use, and where the factors causing that determination cannot be practically mitigated, the recommendation to the decision-maker is to close these routes to non-highway legal motorized vehicle use.

The closure of these routes to mixed motorized use also has a direct effect on routes which branch from these main arterials. These branch routes may not have been individually determined to be unsafe for mixed motorized use; however, the increased infrastructure needs, management controls, and monitoring likely required to keep them open to this use could greatly outweigh any public benefit. In travel system planning, the forest looked at entire transportation systems for the various types of uses in lieu of trying to keep several smaller, and more difficult to manage, opportunities scattered over the entire landscape.

Access to Recreation Opportunities

The forest considers public access to special attractions and general forest areas for highway legal motorized vehicles in this document. A second component of access, which involves whether the users of non-highway legal vehicles may also be authorized to drive to certain destinations need to be considered. Often, users of the forest must rely on state, county or local roadways to access forest roads and trails. State law prohibits non-highway legal motorized vehicle use on public roadways unless the jurisdiction controlling the roadway has made a formal declaration to allow that use (Colorado State Law, Title 33, Article 14.5).

The forest will work with the various state, county and local agencies to determine where non-highway legal vehicles may be legally used on routes under the control of these entities. Decisions in the final travel management plan will reflect the legality and practicality of users of non-highway legal motor vehicles being able to access areas of the forest before being allowed in those areas. The practicality analysis includes factors such as availability of adequate trailhead parking and whether the travel route most likely to be used is legal even though there may be other legal options that are unlikely to be used.

Provision for Recreation Opportunities

In addition to safety and access, the rule also requires the responsible official to consider the provision of recreation opportunities. Alternative C in the first draft looked at maximizing recreational opportunities as the top priority. Consideration of the appropriateness and quality of those opportunities was introduced as a component in Alternative D as it related to reducing user conflict.

In April 2006 the forest developed a forest recreation strategy. In this document, the forest identified some general management goals for the recreation programs. This strategy comes under the framework laid out in the 2002 forest plan and is intended to assist the forest in focusing its limited resources. The strategy does not make site-specific decisions, which will continue to be made through NEPA analysis such as in this travel management plan.

The forest does not begin to have enough resources to accommodate all visitors who would like to have their individual, and very specific, recreational experiences in the location they choose. Thus, a major component of the strategy was to identify what this forest can reasonably provide in terms of visitor experiences that are more unique to our land base and capabilities.

No existing recreational opportunity is proposed to be eliminated from the forest. However, instead of trying to provide all opportunities in all locations possible, the forest will provide opportunities in appropriate locations and of sufficient quantity and quality to be sustainable, manageable, and remain as good visitor experiences.

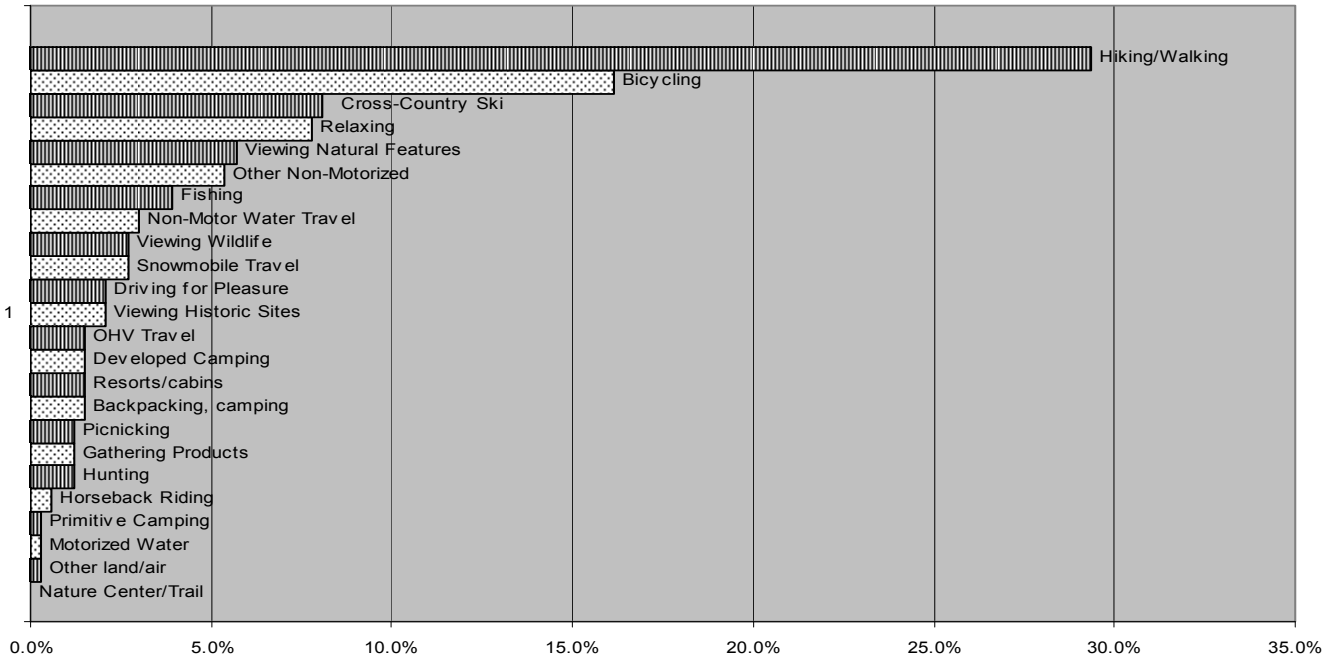
Forest Use Levels

Recreational use and travel on the forest has changed dramatically in the last 20 years since the previous travel management decisions. These changes have primarily come about due to changes in technology and user numbers. Travel management strategies that may have worked previously need to be changed in order to have a sustainable transportation system and quality recreation opportunities into the future.

Recreation use on the forest in 1984 was estimated at 1.36 million recreation visitor days outside of developed sites (USDA Forest Service 1984). By 2000, recreation visitor days were estimated to be at nearly 4.69 million (USDA Forest Service/WRNF 2002b).

The *National Visitor Use Monitoring Survey* (Kocis et al. 2003), was conducted on the White River National Forest between October 1, 2001, and September 30, 2002. This study showed the White River as the most visited forest and indicated almost 70 percent of this use takes place as downhill skiing. Even after subtracting out all of the forest's downhill skiing use visits, the White River still clearly ranks in the top 10 nationally in terms of total recreation use according to national visitor use monitoring (NVUM) figures.

Figure 3.1 shows a chart of the major activities and percent participation rates based on single visits to the forest. Downhill skiing has been excluded because Forest Service routes are not necessary for access to the ski areas.

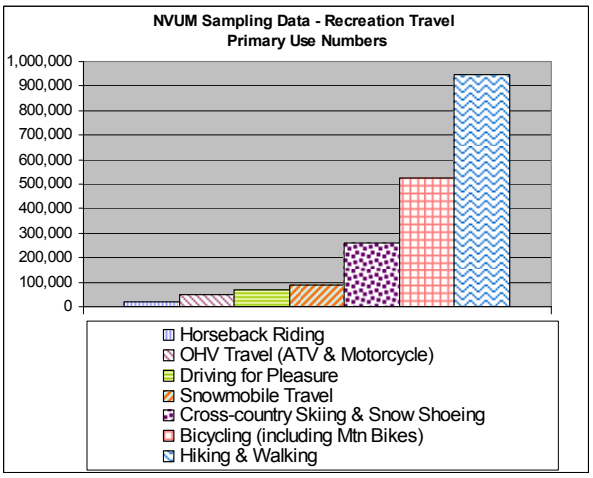


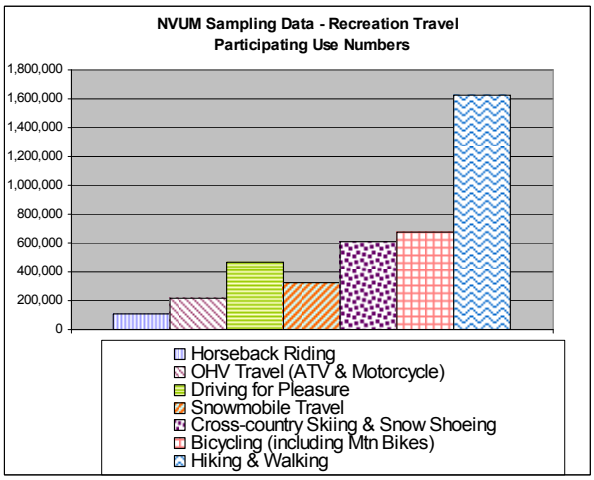
Note: Down Hill skiing equaled 70.8 % of total
The remaining 30% of uses are identified above and percentages adjusted to exclude downhill skiing
Source: Kocis et al. 2003

Figure 3.1—Forest visitor use by activity, 2002

The primary purpose for a visit to the forest and the variety of activities a person engages in while on the forest each provide a different perspective on demand. Figure 3.2 identifies recreation travel-related activities based on the forest's 2002 NVUM surveys displayed graphically, as percentages of use, and as visit numbers. The primary activity figures only represent those individuals who identified the activity listed as their primary reason for their forest visit. In addition to including the primary activity numbers, the participation numbers also pick up those visitors who used this mode of travel in their visit, though the mode of travel wasn't the primary activity. Examples of participation without being a primary activity would include: visitors with a primary activity of camping who also brought along their ATV to ride, or a visitor who hiked to do a primary activity of fishing.

ACTIVITY	PERCENT WHO SAID IT WAS THEIR PRIMARY ACTIVITY - NVUM ACTUAL	ADJUSTED PERCENTS FOR LAND BASED RECREATION TRAVEL ACTIVITIES ONLY	NUMBER OF FOREST VISITORS WHO SAID IT WAS THEIR PRIMARY ACTIVITY	NUMBER OF FOREST VISITORS WHO PARTICPATED IN ACTIVITY
Horseback Riding	0.2%	1.0%	19,349	106,420
OHV Travel (ATV's, dirt bikes, etc)	0.5%	2.5%	48,373	212,840
Driving for pleasure on roads	0.7%	3.5%	67,722	464,378
Snowmobile Travel	0.9%	4.5%	87,071	328,934
Cross-country skiing, snow shoeing	2.7%	13.4%	261,213	609,496
Bicycling, including mountain bikes	5.4%	26.7%	522,425	677,218
Hiking or Walking	9.8%	48.5%	948,105	1,625,323
Totals	**20.2%**	**100.0%**	**1,954,258**	**4,024,609**





Source: USDA Forest Service/WRNF 2002a

Figure 3.2—Allocation of recreation visitor days (RVD) in top ten recreation activities on the White River National Forest, 2002

Analysis for the forest plan showed that recreation use levels on the White River National Forest will likely increase at a faster rate than national participation averages because of the above-average increase in the populations of counties within the forest and the Colorado Front Range (USDA Forest Service/WRNF 2002b).

User Conflict

As more people and differing types of use continue to increase, it is inevitable that user conflicts will also continue to escalate. Conflict on multiple-use trails has been defined more succinctly as “goal interference attributed to another’s behavior” by the National Recreational Trails Advisory Committee of the Federal Highway Administration (USDOT/FHA 1994). Goal interference occurs when a user comes into direct or indirect (seeing the effects of another use) contact with another user type and is impeded from accomplishing the desired purpose of his or her recreation (Badaracco 1976). Conflict is more often characterized as one-sided than two-sided. For example, while backpackers may perceive OHV uses as disruptive to their experience, it is less likely that OHV users will find backpackers disruptive to their experience (Jackson and Wong 1982).

In winter, conflicts on the forest are more apparent as the motorized and non-motorized winter users vie for limited space for their individual pursuits. The limitations of realistically useable terrain available to each user group, the shortage of maintained winter access points, individual users’ incongruent expectations, and the unwillingness on the part of some members of each group to share their experience with the other group all can contribute to winter use conflicts.

From a practical standpoint, an average cross-country skier traveling away from an access point is generally within 3 miles of the access point (Cordell and Bergstrom 1989).

This makes much of the non-motorized winter area, such as wilderness, inaccessible to most users. Additional issues such as avalanche potential, dense vegetation, winter water crossings, and slope make additional areas unsuitable for skiing. In many cases, these same physical features can also make areas unavailable to motorized users even where motorized use is allowed.

The ski hut system has expanded the terrain available to cross country skiing, but only to the number of skiers limited by the hut system capacity. The ski huts were almost all constructed in winter motorized management area prescriptions because of the open nature of the previous winter travel management strategy forest-wide and the need for road access for maintenance. Decisions were made in the forest plan to restore a non-motorized experience around some of these ski huts.

Further complicating the user conflict problem in winter is the limited number of good, maintained access points. These points are traditionally located in motorized management prescriptions that allow motorized uses adjacent to plowed roads utilized to access the sites. Yet, at some of these locations, cross-country skiers are looking for a non-motorized experience and expect the motorized user group to give up space in favor of the skier's experience. The situation at Vail Pass is a good example of this issue. Additional winter access points and improved trailheads are needed in some locations. Analysis for new development of trailheads will be done through a future analysis process.

Perhaps the greatest conflict between cross-country skiers and snowmobilers on a trail is an inequity in responsibility (Cordell 1999). Generally, the snowmobiler has contributed in some manner to trail maintenance while the skier, on the other hand, may be seen as a trespasser using the trail without investment and, in some cases, expecting a non-motorized experience on routes created and maintained by the motorized users.

A more recent conflict has arisen with the increase in people wanting to use all-terrain vehicles year round. Generally unable to traverse unpacked snow, these machines are capable of travel on packed snow under the right conditions. When conditions are not optimal, they may get stuck frequently and can rapidly tear up the smoothly packed snow surface desired by snowmobilers and cross-country skiers. Additional issues occur as these wheeled vehicles make contact with and damage vegetation and land in an effort to get unstuck.

Conflicts also occur among various user groups in summer, most commonly between motorized and non-motorized uses as well as mountain bikers and horse riders. Conflict normally exists whenever incompatible activities occur, and normally include three elements that contribute to the incompatibility of activities: spatial and temporal proximity, dominance over the environment, and dependence upon technology (Bury et al. 1983).

Safety is a frequently cited reason when reports are received about an incident between the groups. Additionally, members of each group lay claim that the other is more harmful to the trail system. Depending on the soil type and/or the timing and volume of use, each user group could be correct.

Cordell (2004) states in chapter V of his outdoor recreation participation trends analysis that studies by Cordell and others on various forest users found that conflict related to mountain bike use was an important issue (Chase 1987, Chavez et al. 1993a, Jacoby 1990, Tilmant 1991, Viehman 1990, Watson et al. 1991). Often, mountain bike riders are seen as interlopers on trails that were previously used by others. Tilmant (1991, cited in Cordell 2004) found that hiker complaints about mountain bike riders included aesthetics,

personal beliefs, and the desire for solitude. Equestrian groups raised concerns related to safety (Chavez 1999, cited in Cordell 2004).

Several public comments received during the forest planning process were very critical of horse use on trails, related to trail damage and manure left by the horses, especially in easily accessible public areas with high horse and hiking use (USDA Forest Service/WRNF 2002b, appendix A).

Unmanaged off-road vehicle use is currently considered one of the four major threats to national forests because of impacts on resources and associated social conflict issues. A survey of Montana OHV users identified that while 76 percent of OHV users agreed that users should avoid riding cross-country, over 20 percent thought it was okay to "sometimes" ride cross-country and the remaining 3 percent stated that they should never avoid riding cross-country (Montana Fish, Wildlife & Parks 2006).

Groups such as the Rocky Mountain Recreation Initiative are advocating separation of motorized and non-motorized user groups on trails for the purpose of reducing user conflict and ensuring a satisfying experience for all trail users (Rocky Mountain Recreation Initiative 2002). Similarly, in support of their activities, the Colorado Off-Highway Vehicle Coalition sponsored an analysis to demonstrate the economic benefits derived from their participants (Hazen and Sawyer 2001).

The potential for conflict exists among all user groups, and even among the different members within a user group, when personal expectations of the desired experience are not being met. Not all use conflicts on the forest are totally recreation-based. In addition to recreation, the National Forest System provides a wide array of resource-based opportunities such as timber harvest, livestock grazing, mining, and oil and gas exploration. Complaints about cow manure on hiking trails are common, as well as plowing of roads in winter for commodities such as timber and oil and gas production, which makes them impassible for cross country skiing and snowmobiling. Conflict arising from these non-recreation uses is considered within the analysis process for the decisions about managing these individual activities.

Conflict situations may be caused by management trying to allow too many options for users where the situation may be of marginal quality to meet the user expectations. By simply allowing activities to occur in an area, the visitor heads into that area expecting to fulfill their personal expectations. When the experience offered in that location fails to meet expectations, the user will sometimes create their own experience rather than going to another location. This can create conflict with other visitors because the one visitor is now infringing on the experience of others.

Lastly, conflict occurs when forest users knowingly partake in unauthorized uses. Fortunately, only a small percentage of the total forest visitors fall into this category. However, as forest use increases, the total number of visitors in this category also increases.

An associated problem created by unauthorized use occurs when visitors who normally would not violate will observe and follow the unauthorized behavior of others. As time passes and management does not commit resources to stop the problem, it becomes accepted and continues to expand and grow as an accepted activity. At some point the users begin to feel entitled to continue this activity even though it developed during circumstances under which it was not allowed. Often times, once a trail has been established by users, it is perceived to be "open for use" (Brooks and Champ, 2006).

In a time of flat budgets, increasingly more management resources are needed to deal with this problem, taking the management funds and support away from activities the

forest does want to provide. Management aimed at focusing some uses into more concentrated and better managed areas can isolate these individuals and reduce the complexity and resources needed to manage unauthorized use.

Key Indicators

Key indicator: Recreation opportunity within ½-mile of a road or trail.

Measure: Total road and trail miles by alternative and by use type.

Key indicator: Recreation capacity for each use by alternative.

Measure: Persons at one time (PAOTS) available for each use by alternative.

Affected Environment

The forest currently has 2,049 miles of forest roads and 1,921 miles of forest trails officially open to recreational use in the summer. An additional 1,095 miles of unauthorized roads and trails occur on the forest (labeled user-created routes) and are being used by recreationists. Some of these routes are left over from previous management activities that ended long ago; others originated from ongoing management activities; and still others were illegally created by users for various purposes. However created, these user-created routes are almost all being used for some recreation activities at the present time.

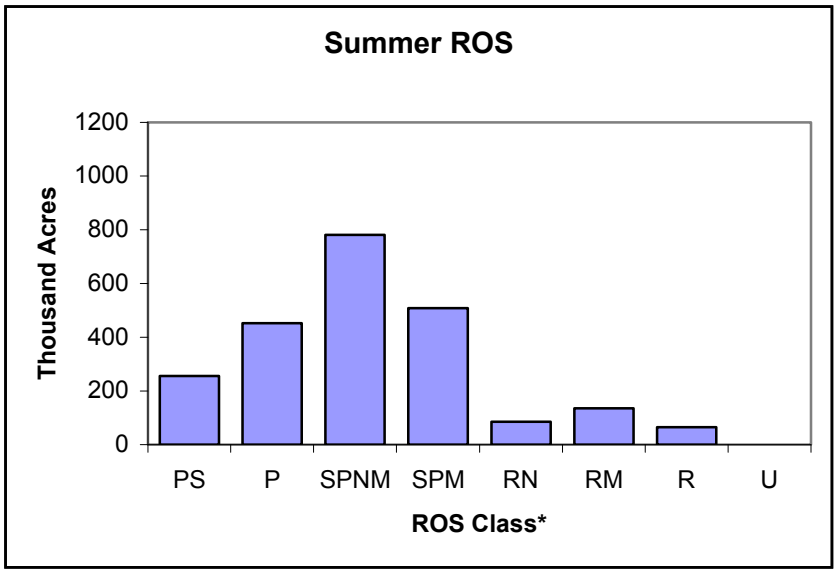
While site specific road and trail analysis was not completed in the forest plan, many of the decisions that were made set sideboards on the road and trail-specific decisions which will come from this analysis. Decisions made in the forest plan are not being revisited in this document.

Recreation Setting

Visitors have different preferences for the recreation setting in which they like to recreate and for the activities in which they want to participate. For some forest visitors, traveling on a primitive road with other members of their club is ideal. Other visitors prefer traveling in an unroaded setting with few other visitors, if any, present.

With recognition of such differences in user preferences, the primary aim of managing outdoor recreation is to provide an environment in which visitors can enjoy a satisfying experience. By managing the natural resource setting and the activities that occur within it, forest managers provide for a range of recreation opportunities. These opportunities can be expressed in terms of three principal components: activities, setting, and experience. For the purposes of management, the range of possible combinations of activities, settings, and probable experience opportunities has been represented in terms of a spectrum or continuum. This continuum is called the recreation opportunity spectrum (ROS).

A more complete discussion of the decisions made on ROS condition classes is available in the forest plan (USDA Forest Service/WRNF 2002b). Figures 3.3 and 3.4 display summer and winter acreages assigned to each ROS class.



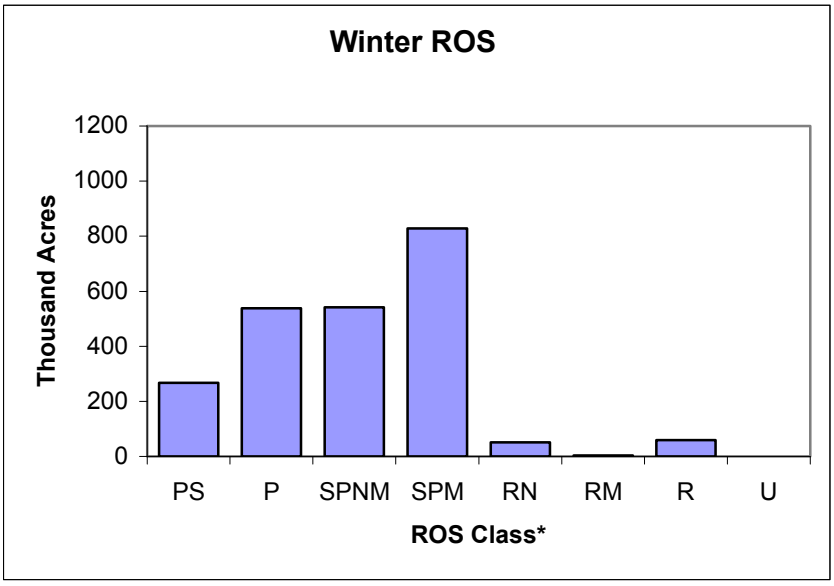
Abbreviations—

PS: pristine; P: primitive; SPNM: semi-primitive non-motorized; SPM: semi-primitive motorized; RN: roaded natural; RM: roaded modified; R: rural; U: urban

NOTE: Motorized use is excluded in the semi-primitive non-motorized, primitive and pristine ROS class

**Few acres exist in the urban ROS class and do not show on the charts at this scale.*
Source: USDA Forest Service/WRNF 2002a

Figure 3.3—Acres in each ROS class, summer, White River National Forest.



Abbreviations—

PS: pristine; P: primitive; SPNM: semi-primitive non-motorized; SPM: semi-primitive motorized; RN: roaded natural; RM: roaded modified; R: rural; U: urban

NOTE: Motorized use is excluded in the semi-primitive non-motorized, primitive and pristine ROS class

**Few acres exist in the urban ROS class and do not show on the charts at this scale.*
Source: USDA Forest Service/WRNF 2002a

Figure 3.4—Acres in each ROS class, winter, White River National Forest.

New and Changing Uses

Technology has contributed to significant changes in the amount and types of uses placed on the national forest transportation system. Off-highway vehicles were just coming onto the scene when the first forest plan was completed in 1984. OHV registrations in Colorado increased 223 percent between 1995 and 2003, to around 75,000 OHV registrations in 2003. Colorado snowmobile registrations continue to grow at a rate of around 4 percent annually (CDPOR 2003). The changes in technology for these machines allow them to travel in more areas, with less rider skill than was required in the past.

The mountain bike was barely more than a novelty in 1984. In 2003, 69 percent of Colorado households owned at least one bicycle, with 74 percent reporting they sometimes bicycle (CDPOR 2003). In 2002, an estimated 677,000 visits on bicycles occurred on the forest, with the use dominated by mountain biking (Kocis et al. 2003).

Cycling downhill at Colorado ski areas is becoming a major recreation attraction and significant source of revenue. In 2002, over half of all summer visitors to the resorts biked at one of the ski areas in the state. Seventy percent of the bicyclists at ski areas were from out of state (CDPOR 2003). Extreme sports have become popular for several activities; downhill (fall line) mountain biking is just one example of this trend.

Technological advancements in snowshoes, cross-country ski equipment, and hiking boots have allowed a greater range and number of individuals to more easily participate in these activities. Winter conflicts are occurring in some areas where skiers are more frequently using snowmobiles to access backcountry areas for a powder, downhill skiing experience. Conflicts also can occur when people use snowmobile trails for cross-country skiing and snowshoeing.

In addition to those uses mentioned above, privately owned snowcats and aircraft are becoming more common on the forest. Mountain boards, similar to skate boards but with larger wheels and altered suspensions, are being used on several roads and trails. Sailboards are being used over snow, and parachutes are being used for both over-the-snow and over-land travel in conjunction with skis or bikes. Hummer vehicles and all-terrain vehicles are being fitted with tracks to go over the snow. Available on the market are full-size OHVs capable of climbing over obstacles that would have easily stopped a Jeep just 10 years ago. It is unknown whether any of these uses will grow on the forest or what new methods of transportation may appear in the future.

All of these new and changing technologies and uses contribute to the challenges of travel management on the forest.

Hunting and Fishing

Transportation to hunting opportunities is one of the more controversial travel issues for the public. During the fall hunting seasons especially, the forest currently expends a disproportionate percentage of management time and maintenance resources for the number of visitors who hunt compared to the number of visitors involved in other activities on the forest.

Hunting, fishing and wildlife watching are significant activities and economic necessities for many communities adjacent to the forest. Nationally, recent U.S. Fish and Wildlife surveys have indicated a downward trend in the total number of hunter and angler numbers. From 2001 to 2006 the number of anglers dropped 12 percent and the hunter count decreased by 4 percent (U.S. Fish and Wildlife, 2006). The same survey indicated an 8 percent increase in wildlife watching.

While it is unknown how those trends relate directly to the White River National Forest, there is reason to believe that existing extenuating circumstances on and adjacent to the forest may neglect or at least minimize the effects of these trends. Top angling professionals (Field and Stream 2008) have recently identified Glenwood Springs as the number one ranked fishing community in the nation. With an estimated population of over 40,000 animals, the White River Elk Herd has been proclaimed as the largest migratory elk herd in North America. Based on the above citations, the White River National Forest can expect to receive continued focus and visitation from both local as well as national hunters and anglers.

All areas of the forest (except private land in-holdings) are open to hunting and fishing. While angling use occurs throughout much of the year, the majority of hunting use is concentrated during the fall big game seasons. There are 16 game management units which encompass the forest. These units have been managed as both limited use units as well as general season units allowing unlimited licenses.

Three basic categories of hunters exist: backcountry, hiker, and vehicle/OHV supported hunter. The backcountry hunter usually hunts from horseback or is packed to a remote location. The hiker hunter will generally hike 1-4 miles from a road or roadside camp to access a hunting area. The vehicle hunter enjoys traveling to a hunting area by vehicle or OHV and often desires to be able to retrieve game with motorized vehicle support. During the past 15 – 20 years, the forest has witnessed a significant increase in ATV use during the hunting season. This increase has resulted in the creation of additional conflicts among hunters with differing philosophies. Over 40 percent of resident big game hunters and 30 percent of non-resident big game hunters indicate that the most frequent and negative access problem was finding areas that are not crowded. Seventy percent of hunters support the designation of more areas where the number of big game hunters is limited (Manfredo 1992). In a survey conducted of OHV users in Montana, over 78 percent of those surveyed stated that OHV users should access the area they intend to hunt on legal routes and then should hunt on foot. However, in the same survey, more than 58 percent of those surveyed admitted they at least sometimes travel off route to retrieve down game (Montana Fish, Wildlife & Parks 2006).

In 2003 the Congressional Sportsmen's Foundation sponsored a survey to specifically collect information related to access to federal hunting lands in Colorado. The following captures just some results from this study (Access to Federal Hunting Lands in Colorado 2003):

- Access to national forest/grassland lands had the highest rating for all types of lands for access (73 percent rated it excellent or good).
- Those respondents who have hunted on federal public land in the past 10 years in Colorado were asked to indicate whether more or less access, or the same level of access, should be provided to hunters on federal public lands in Colorado by various modes of transportation (e.g., by foot, horse, ATV). Access by foot had the highest percentage saying that *more* access should be provided (49 percent). Horse access also had a relatively high percentage favoring *more* access (32 percent). All three motorized modes of access had the highest percentages saying that *less* access should be provided: 70 percent said that there should be less motorbike access, 56 percent said that there should be less ATV access, and 29 percent said that there should be less truck access.
- The most common interference problem was with those on ATVs (18 percent of respondents reported interference by ATVs), with resident hunters being slightly

more likely than nonresident hunters to have experienced a conflict with ATV users. The second highest conflict was with mountain bikes (10 percent).

Hunting

While the White River National Forest receives use from a wide range of big and small game hunters, the majority of use occurs during the fall deer and elk seasons. National visitor use monitoring data collected in 2002 identified that only 0.4 percent (38,698 visitors) of the total visitors identified hunting as their primary activity (Kocis et al. 2003).

To further evaluate and quantify the timing and amount of hunting use on the forest, the forest has computed the total deer and elk hunter recreation days on the forest using numbers generated from the Colorado Division of Wildlife 2006 harvest surveys. The evaluation identified the number of hunters and hunter recreation days for each big game management unit located on the White River National Forest and multiplied these numbers by the estimated percent of forest use for each season. Percentages were based on historic use during normal weather conditions. Under normal conditions, the majority of hunters utilize National Forest System lands during the earlier seasons and, due to the movement of animals to lower lands as the seasons progress, a decrease in hunter percentages on the forest occur during each of the latter seasons. The following percentages were used to measure the recreation days on the forest for each season: early season = 98 percent, archery & muzzle loading = 93 percent, 1st rifle (elk only) = 85 percent, 2nd rifle (1st combined) = 80 percent, 3rd rifle = 65 percent, 4th rifle = 50 percent, and late season = 25 percent.

Figures 3.5 and 3.6 identify the results of these computations. Note that all private land, ranching for wildlife, and late season deer hunt numbers where excluded from these figures. While it may be expected that some hunters hunt both deer and elk during the combined seasons, the analysis did not separate those use numbers, thus resulting in the duplicate counting of those hunter and recreation days. Also, it is expected that many hunting camps include people, friends and family, who may not be hunting during the time but are accompanying other license holders. These “accompanying” visits are also not captured within this analysis.

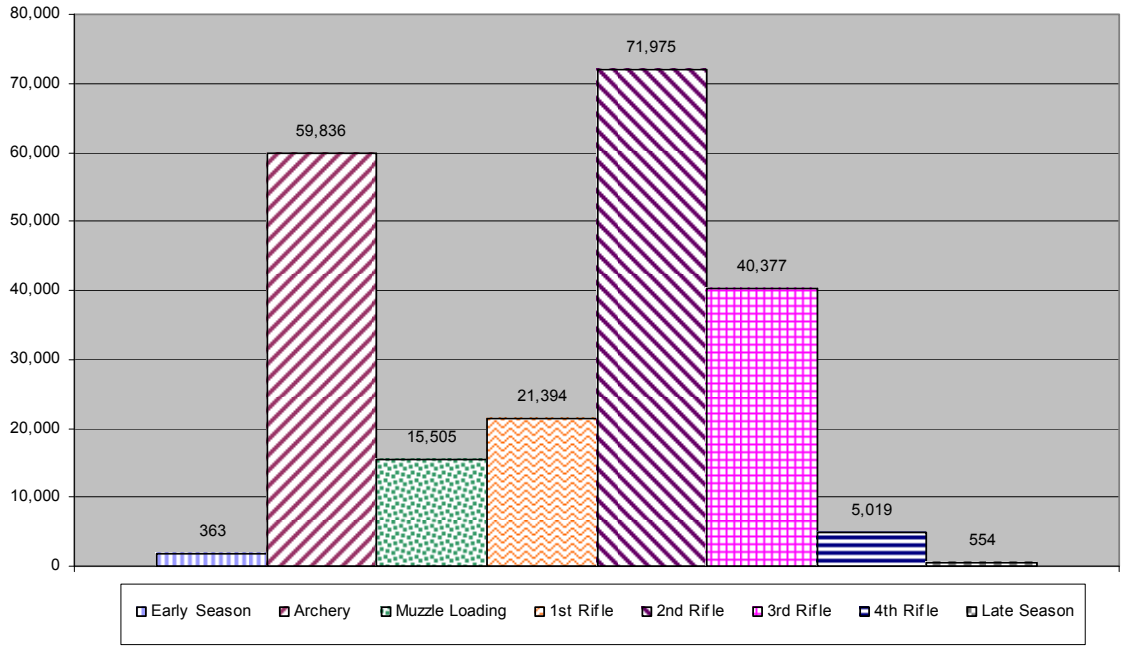


Figure 3.5— Number of hunting recreation days on the White River National Forest

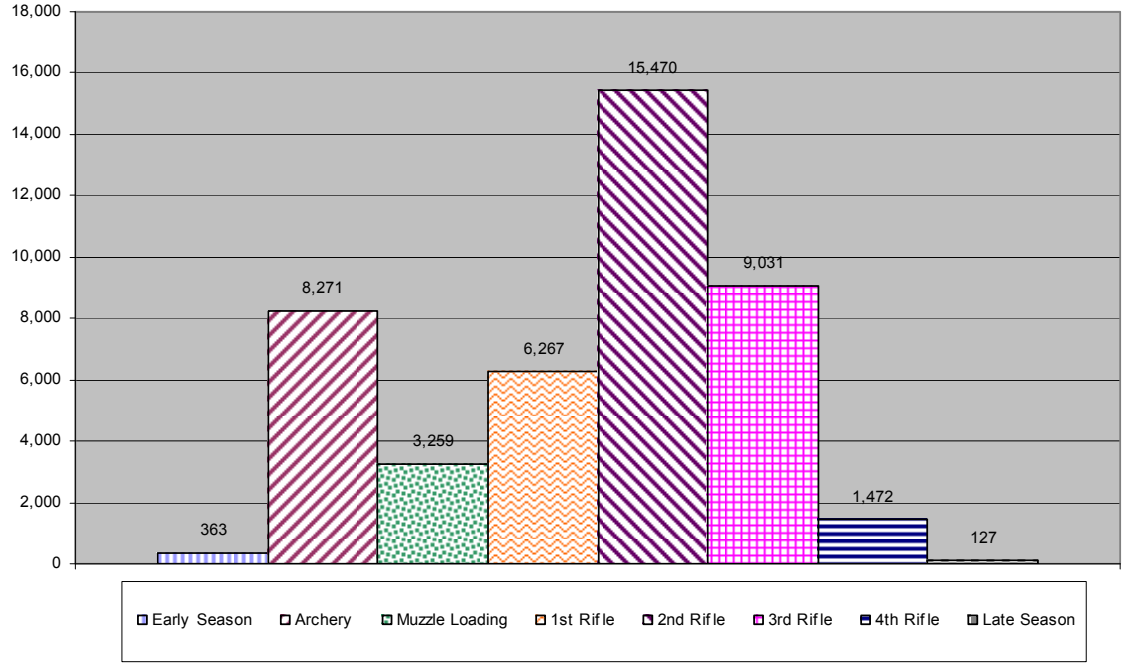


Figure 3.6— Number of hunters by hunting season on the White River National Forest

While the above numbers are slightly different from the numbers generated through the 2002 NVUM sampling process, these analyses resulted in relatively comparable overall numbers (less than 14 percent difference) between the two. It should also be noted that the 2002 White River use estimates were actually performed in fall of 2001 immediately following the 9/11 disaster and a major fire season. All recreation use sampled nationally on National Forest System (NFS) lands in the year following 9/11 were down compared to surrounding years.

The quantity of hunters on the forest during this two month period, coupled with an increase in the percentage of hunters who use ATVs to access their hunting areas, fuels the existing philosophical differences between motorized and non-motorized hunters. The lack of clear travel route designations in some areas, resulting in the inability for each type of hunter to fully understand where motorized access is allowed versus areas where non-motorized hunters may go to avoid encounters with motorized equipment has led to many of the conflicts (see wildlife section for description of impacts on big game from motorized use and transportation section for effects on road maintenance due to hunting traffic).

The Forest's Role in Meeting Future Demand

The mission of the Forest Service is to provide multiple benefits and opportunities. However, the land-base on a single forest is not large enough, nor are managerial resources great enough, to provide all of the opportunities desired by recreationists. The greater the variety of unique opportunities a forest attempts to provide, the more diluted its capability for providing quality opportunities.

National forests need to provide visitors a focused, high quality outdoor recreation program based on prioritized needs within the capacity of existing human and financial resources. Coordination with other outdoor recreation provider agencies is necessary in order to identify respective roles and niches (Colorado Recreation Strategy, p. 11). If the opportunities the forest is providing are very similar to opportunities the same visitors are provided in adequate supply elsewhere, a non-essential duplication of effort is occurring.

Between 2004 and 2006 the White River National Forest analyzed who the visitors to the forest were, what some of their expectations were, and where the White River National Forest should be focusing recreation management efforts to position the forest for the future. It was evident that the White River National Forest is best known for the attraction of visitors to the resort community areas and to the undeveloped wild lands, and that this is where forest efforts should be focused (Recreation Site Facility Master Plan 2005). Use on the White River National Forest is dominated by downhill skiing in the winter and non-motorized activities in the summer (NVUM 2002). A review of data indicated other entities, such as neighboring forests, serve far more visitors in motorized backcountry activities (NVUM 2002).

One of the goals stated in the forest plan is to emphasize providing a wide range of motorized, mechanized, and non-motorized recreation opportunities and difficulty levels spread across the forest (USDA Forest Service/WRNF 2002a, p. 2-37). Even though the focus for the forest may be on resort related (more structured) and primitive setting (generally non-motorized) related activities (recreation niches), the forest still needs to provide some high quality recreational experiences to backcountry (dispersed including motorized) related activities.

Nearly 800,000 acres of forest are currently available for designated motorized travel routes in the summer and approximately 700,000 acres are available for open motorized travel in the winter (USDA Forest Service/WRNF 2002b). This does not necessarily

mean that all types of motorized use will be available in all areas. There may be large areas of the forest where one or more motorized use and visitor experience will be emphasized over others. The long-term quality, manageability, and sustainability of the activities will be considered when making these decisions.

National Forest System lands are finite. While it is the agency's goal to provide for public use, the agency also has a responsibility to manage the land resources. Given the limitations, it is not likely that each forest can be expected to meet all current and future demand for activities that are allowed in the National Forests. As demand continues to increase, there will ultimately be limits on the amount of use that can be sustained. Increased use requires additional expenditures, maintenance, management, and enforcement. With the reality of increasing pressures from use of primitive settings, regimentation and control of visitation may be necessary to protect the integrity of the opportunity and to ensure its use into the future. This is particularly true where management objectives call for the preservation of naturalness (Fazio and Gilbert 1974, Stankey 1979, from ROS, p. III-18).

A lack of active management of some uses in the past has resulted in a change in users and use patterns on the forest. More than 20 years ago, researchers documented how a change in circumstances, such as greatly increased use, affects the opportunities and experiences available (Forest Service ROS 1986, p. III-21–III-25). Clark describes this as a process of "invasion and succession" (Clark et al. 1971, from ROS, p. III-24). Quite often these changes occur more slowly over time. Existing users are displaced because they are no longer receiving their desired experience and the new users fill the void left by the departing users. These changes generally occur outside the agency making conscious management decisions. Although some users are vocal about their changes in experience, the loss of recreational opportunities largely goes unnoticed until well down the road when the new and sometimes less desirable use pattern is set.

Changing Recreation Management to a Visitor Focus

Traditionally, the forest has managed the recreation program based on general physical features such as the miles of trail open to bicycles, the acres open to snowmobiling in the winter, and the number of campsites available for camping. Uses were generally allowed unless there were serious enough issues to force the forest to take management action to reduce the problems.

A common misperception is thinking that providing any opportunity equates to providing everything needed for a quality recreation experience. The designation of a physical road or trail as open for a given activity is only the beginning of providing a satisfying visitor experience. Decisions about what routes will be open to which uses will require consideration of the forest's management ability to provide a complete experience.

Nationally, the Forest Service is committed to improving the capability of the national forests and grasslands to provide diverse, high quality recreation opportunities (USDA Forest Service/WRNF 2002a, p. 1-10). Not all visitor demands can be met on each individual forest. Difficult decisions need to be made regarding which visitors will have an opportunity for a quality recreational experience and which visitors may have to seek out alternative locations for their desired experiences.

In April 2006, the forest reaffirmed the 2002 decision to provide high quality recreation opportunities by creating a matrix of forest-wide recreation strategies based on forest niche and providing quality visitor experiences (Forest Management Matrix 2006). These strategies focus on providing sustainable high quality experiences in appropriate

locations; however, that does not mean all current opportunities will be offered in the same quantities and locations.

Trail System Budget and Finance

The forest currently has approximately 1,948 miles of identified summer system trails. For fiscal year 2007, the budget for the entire forest was $652,423 to perform all management, maintenance and capital improvement on the trail system. The forest reported an accomplishment of 422 miles of trail maintained to standard. The definition used for this reporting was only to meet critical safety and legal standards and did not include meeting standards for cleanliness or resource protection.

By 2012, a forest strategy in the forest plan is to have 30 percent of the trail mileage that is currently rated poor or critical receive appropriate maintenance or reconstruction (USDA Forest Service/WRNF 2002a, p. 1-10). Other strategies include improving the safety and economy of the roads, trails, facilities, and operations and providing greater security for the public and employees. This includes decommissioning 22 miles of roads each year and an emphasis on maintenance and reconstruction of the existing road and trail system to standard (USDA Forest Service/WRNF 2002a, p. 1-4, 2-37). These strategies are not requirements, but rather are methods listed to help attain goals and objectives. They help the forest to set priorities to meet the goals set forth in the forest plan.

Often times, the adoption of user-created routes into the official travel system costs as much as it would to plan and construct a route from the beginning. Environmental sustainability was not considered in the formation of user-created routes, and there may be additional costs to rehabilitate sections that need to be fixed or replaced. Designated or new travel ways will be open to appropriate motorized or mechanized use unless financing is not available for maintenance necessary to protect resources (USDA Forest Service/WRNF 2002a, pg 2-36). All user groups will need to become more involved in trail maintenance and management on the trails they use for the forest to be able to sustain its current extensive trail system. User-created routes not adopted in this decision will be slated for rehabilitation. While this too costs money, this expenditure is a one time cost and helps to return the ground to a natural state, which can also enhance surrounding recreation experiences.

Forest Service trail budgets are not expected to significantly increase in the near future. Because the forest is currently falling far short of being able to manage and maintain the current trail system, before adding new routes, the forest will need to review whether they have the capability to reasonably ensure that the new route is manageable and sustainable. Proponents for new routes will likely be asked to assist the forest with planning, construction, and maintenance of new routes. Partnerships, grants, and volunteers all greatly contribute to the sustainability of the trail system.

Though the forest clearly cannot afford to maintain the existing transportation system to standard at current budget levels, this is not the only financial consideration when it comes to deciding what the final system needs to look like and what visitors it will serve. The economies of local communities are heavily dependent on revenues associated with visitors recreating on the forest. Total economic benefit of forest activities was analyzed in the forest plan. In 2000, it was estimated that the economic effects of monies spent by visitors in pursuit of recreation on the forest, excluding ski area use, was nearly $91 million. Projections are that by 2010 it will be nearly $114 million (USDA Forest Service/WRNF 2002b, appendix B, p. B-33). Nearly all recreational activities on the forest are dependent on the forest's transportation system in some manner.

Keeping any level of transportation system open above the forest's ability to maintain it will result in a continued deterioration of the overall system. The Forest Service will continue to concentrate limited resources on the more heavily used routes and those having the most safety and environmental issues. Eventually, evaluations may have to be made as to how much to invest in a route and whether a route should be retained based on the amount of use and the ability to retain sound condition. This may have some effects on local economies, as more use is concentrated on those routes kept open and users are no longer achieving their desired recreation experience.

Maintenance of the travel routes is only one cost associated with providing road and trail opportunities. Additional costs are associated with general management of the system, law enforcement, tracking of maintenance needs, managing user conflicts, signing, and public information and planning. The more funding that continues to be redirected from maintenance activities for other items, the more rapidly the routes themselves will decline.

The costs of some management activities are set and cannot be reduced. Other costs can be reduced through proper transportation system planning and design by authorizing uses on routes that can be environmentally sustained. Such management can result in cost reductions by reducing time spent, managing user conflicts, decreasing the need for law enforcement, and reducing trail maintenance. An estimated cost comparison for the implementation of the travel plan alternatives is included in the transportation section.

Special Trails and Areas

The Continental Divide National Scenic Trail (CDNST extends for about 3,100 miles from Canada to Mexico and crosses the forest from Tennessee Pass to Loveland Pass (a distance of about 67 miles). Some of this route close to Loveland Pass is still being developed. On the western side of the forest, much of the CDNST route is coincident with two other trails: the Colorado Trail (CT) and the American Discovery Trail (ADT). These trails are discussed in detail in the forest plan (USDA Forest Service/WRNF 2002b).

The forest has 61 miles of national recreation trail: the Wheeler-Tenmile Trail (23 miles), the Tenmile-Vail Pass Trail (30 miles), and the Two Elk Trail (8 miles). The Wheeler-Tenmile Trail partially coincides with the CDNST, Two Elk, ADT, and Colorado Trail.

In addition to designated trails, other trails are crucial for access to special places. There are 10 peaks over 14,000 feet in elevation on or bordering the edge of the forest. "Peak bagging" Colorado's 14,000-foot peaks has become very popular in the past several years. Ascents on the state's "fourteener's" have increased 300 percent in the past decade from 65,000 to 200,000 per year (CDPOR 2003). Many of the peaks that lie in wilderness have never had designated routes to the summits. Heavy use has resulted in multiple trails and resource impacts.

More than 103,000 visitors come annually from around the world to view the three 14,000 foot peaks surrounding Maroon Lake and to hike trails in this area. Because of the constant high number of summer visitors to the Maroon Valley, a mandatory bus system was set in place to serve this location. Hanging Lake receives an estimated 140,000 visitors annually on the mile-long trail to Hanging Lake in Glenwood Canyon.

Environmental Consequences

General Effects

Recreation use is expected to continue to increase in all alternatives. The increase in each type of use will likely vary by alternative and ultimately be limited by the quality of the recreational experience an individual user has.

Aside from downhill skiing, most of the recreational use that occurs on the forest in non-motorized activities would be as shown in figure 3.1. However, the non-motorized uses tend to require less area for a day's use experience due to slower travel times associated with non-motorized travel. For instance, the average snowmobile rider in Colorado travels around 50 miles in a day (Hazen and Sawyer 2001). In contrast, most cross-country skiers stay within 3 miles of a winter access point for their daily activity, although some may expand that distance to approximately 6 miles of travel per day, more or less, depending on the opportunity available for loop trails within that area (Cordell and Bergstrom 1989).

This does not necessarily mean that the snowmobiler needs eight times as much area as does the skier. Conversely, the fact that skier/snowshoe visit numbers are three times higher than snowmobiling use numbers and have a faster growth rate (USDA Forest Service/WRNF 2002b) does not mean skiers and snowshoers need three or more times as much area than snowmobilers. Other factors such as crowding, the willingness on the part of a user to recreate in the same area more frequently, and a willingness to share with other use types weigh in on the amount of resources allocated to a particular use. Expectations of crowding and the setting also play significant roles in the decisions. Users are generally willing to accept a greater number of visitor contacts in a more developed setting than is acceptable in remote backcountry. This makes the decision to assign specific uses to individual roads and trails a decision based on social factors as much as a decision based on raw numerical data.

Roads and Trails

While the road and trail systems may be shared, different users have varying preferences on which transportation system they prefer to use for the quality of their experience. Although they can legally hike on roadways or motorized trails, most hikers seek a single-track trail experience away from roadways and motorized trail uses. Mountain bikers often prefer single-track experiences but generally accept sharing the more primitive road experiences with other users more than hikers do. All-terrain vehicle and motorcycle groups tend to be more tolerant of full-size vehicles on primitive roadways. However, they still look for trail experiences where the chances of encountering a variety of other user groups are reduced and where they can have a better backcountry experience than can on a highly developed roadway.

No single measure can provide conclusive direction on how to best allocate limited resources for all these diverse user groups. Even within a particular user group, the participants have differing expectations for their recreational experience. Ultimately, a variety of measures and professional judgment must be used in the allocation process.

Direct and Indirect Effects

The analysis for recreation use on travel ways was completed in two distinct parts. The first of these parts involved identifying and performing a site-specific evaluation on each of the roads and trails under Forest Service jurisdiction on the forest.

It included reviewing each road and trail as identified in alternative A, the no action alternative, to determine if it met the direction set in the forest plan for both the management area prescription and the ROS management goals. System roads and trails that were found to be consistent with forest plan direction are identified in alternative F. The other alternatives took into consideration unauthorized routes identified. Once the cross-check on the no action alternative (current condition) was completed, a multi-disciplinary team from each of the ranger districts evaluated each road and trail on their district and proposed a management strategy consistent with the alternative themes for Alternatives C, D, and E for the first draft of this document. The same checks as were done for Alternatives C, D, and E in the first draft were also completed for Alternative G in this second draft.

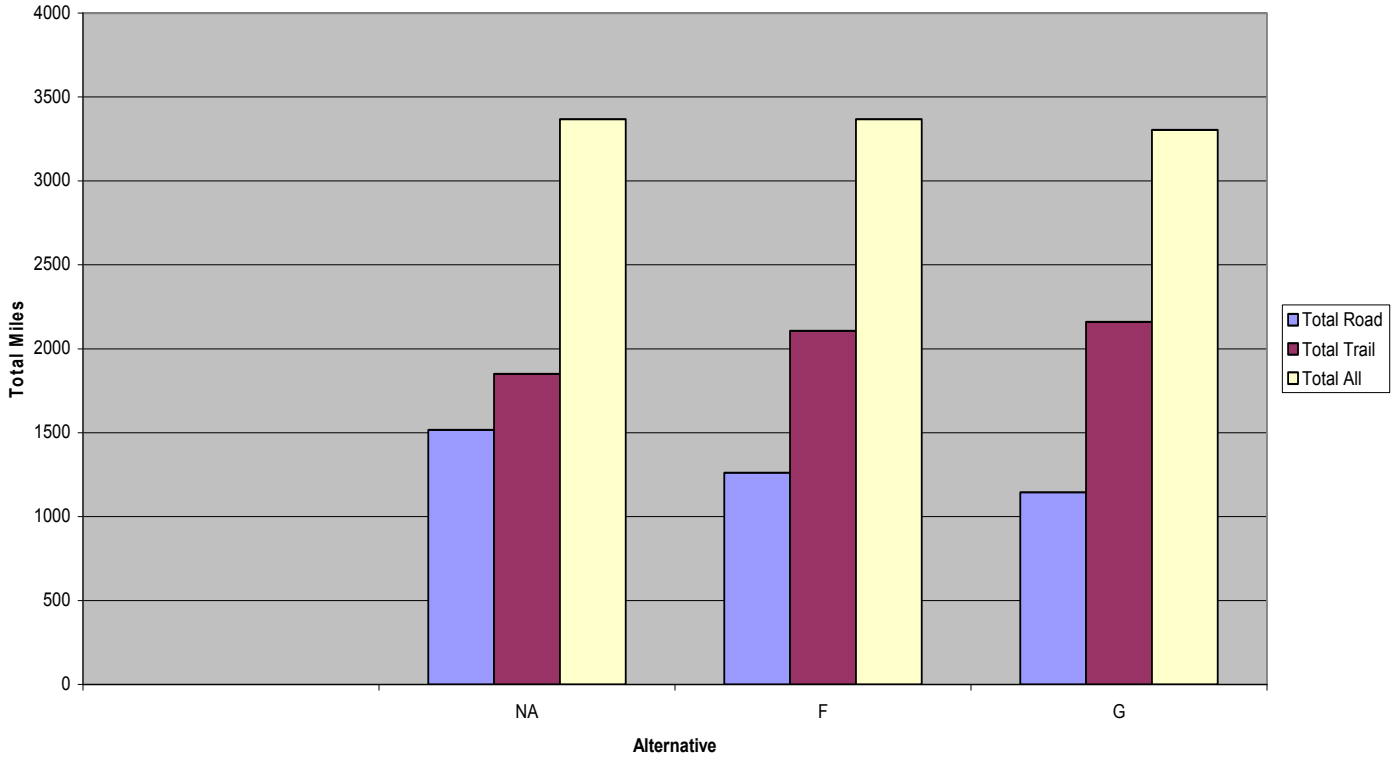
The second part of the recreation analysis involved compiling site-specific information for a forest-wide analysis as described in this EIS.

Summer Season

Most resource-based recreation use occurs within ½-mile of a road or trail (Cordell et al. 1990). When analyzing an overall forest program, it is logical to assume that the maximum number of miles of road and trail open to the most uses will provide the maximum overall volume of recreational opportunities on the forest. Such an assumption does not consider the quality of the individual user experience. A comparative analysis of total open road miles of all types is done in the transportation and infrastructure section of this analysis.

Rather than just comparing general recreational access, some activities are transportation type activities where the travel route is a key part of the experience. These include hiking, horseback riding, mountain biking, ATV use, and motorcycling. While some activities may legally take place on maintenance level 3 through level 5 routes, it is generally considered that the majority of the aforementioned users are only using these higher level routes as access to get to their desired activity rather than as a quality component of the activity itself.

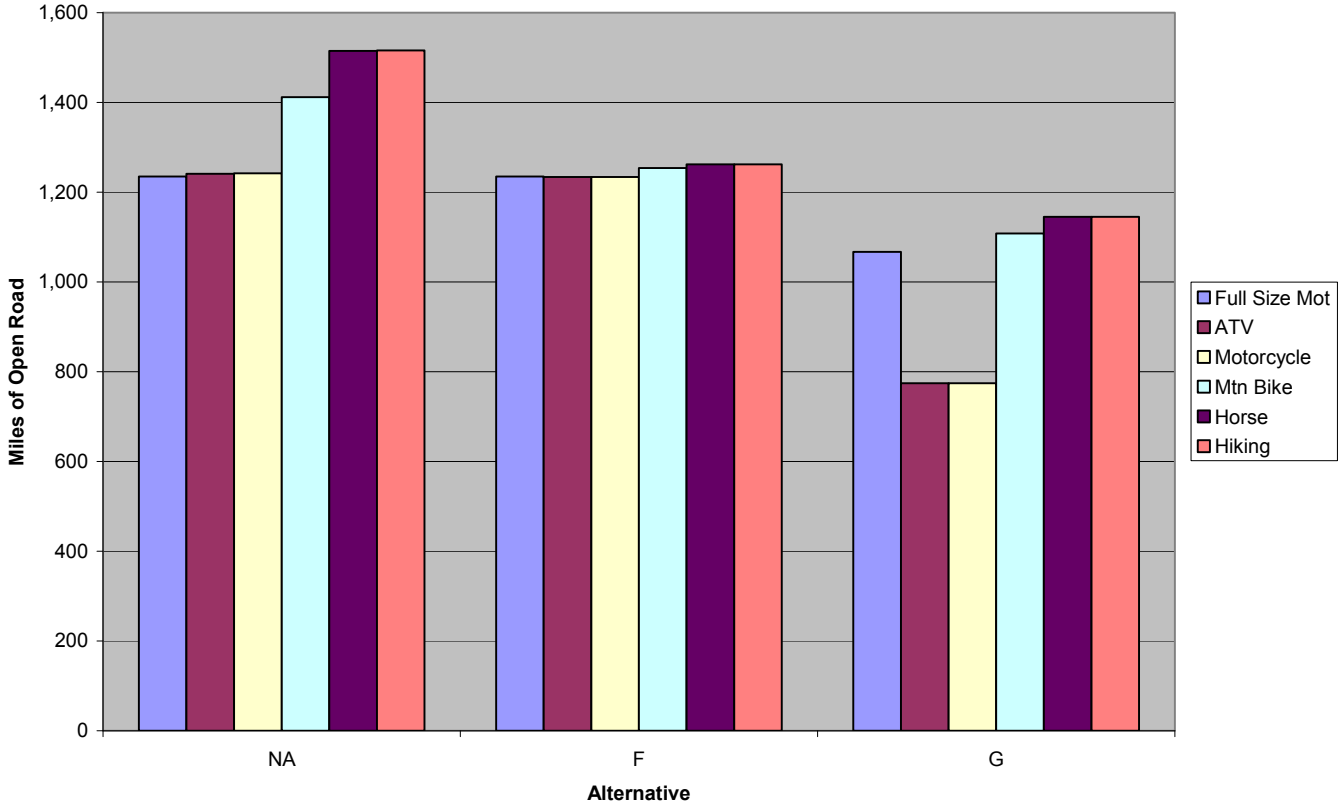
Figure 3.7 shows the total open level 2 roads and trails mileage by alternative. Alternative A would have the highest total miles open for travel, followed by Alternatives F and G, respectively.



Source: White River National Forest, GIS data

Figure 3.7—Total miles of roads and trails by alternative

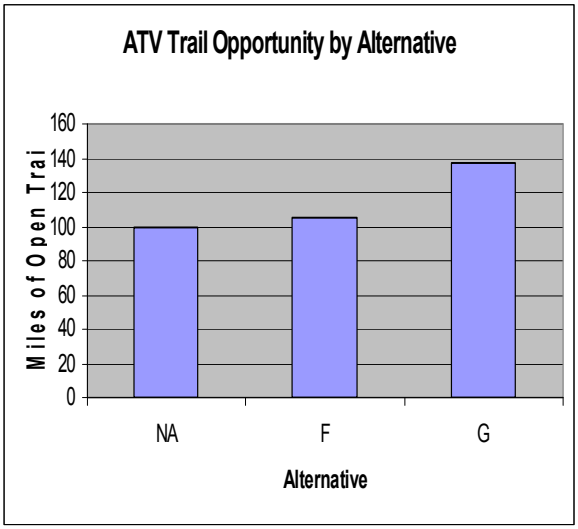
Figure 3.8 gives a comparison of the total number of open level 2 road miles by alternative by use. Alternative A, the no action alternative would have the most miles of open level 2 roadways for all uses, followed by Alternatives F and G.

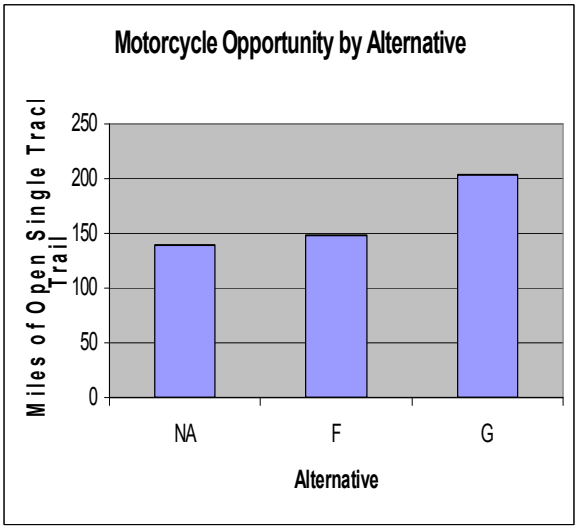


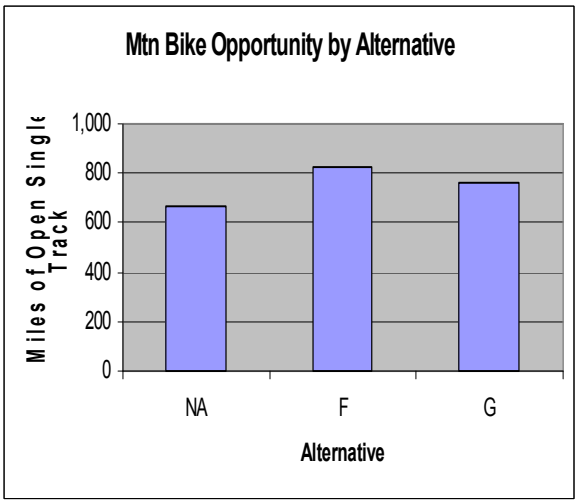
Source: White River National Forest GIS data

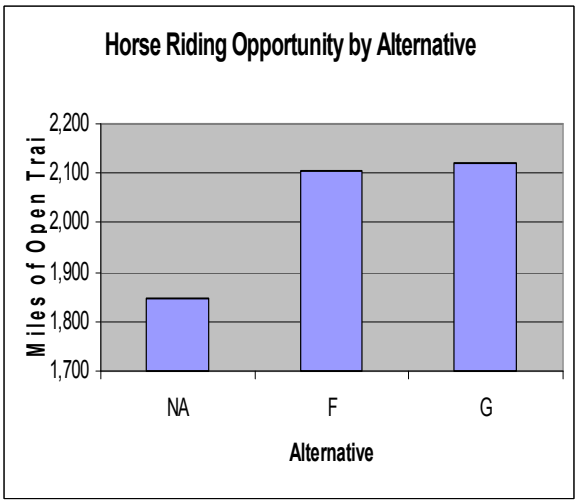
Figure 3.8—Open roads by alternative and use type

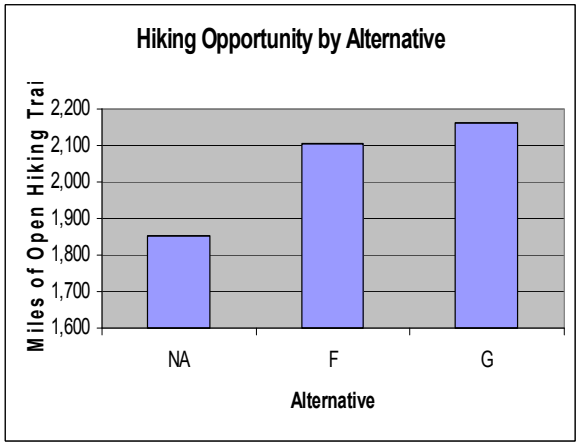
Figure 3.9 provides comparisons of the total number of open trail miles by alternative by use.











Source: White River National Forest GIS data

Figure 3.9—Recreation opportunities by alternative

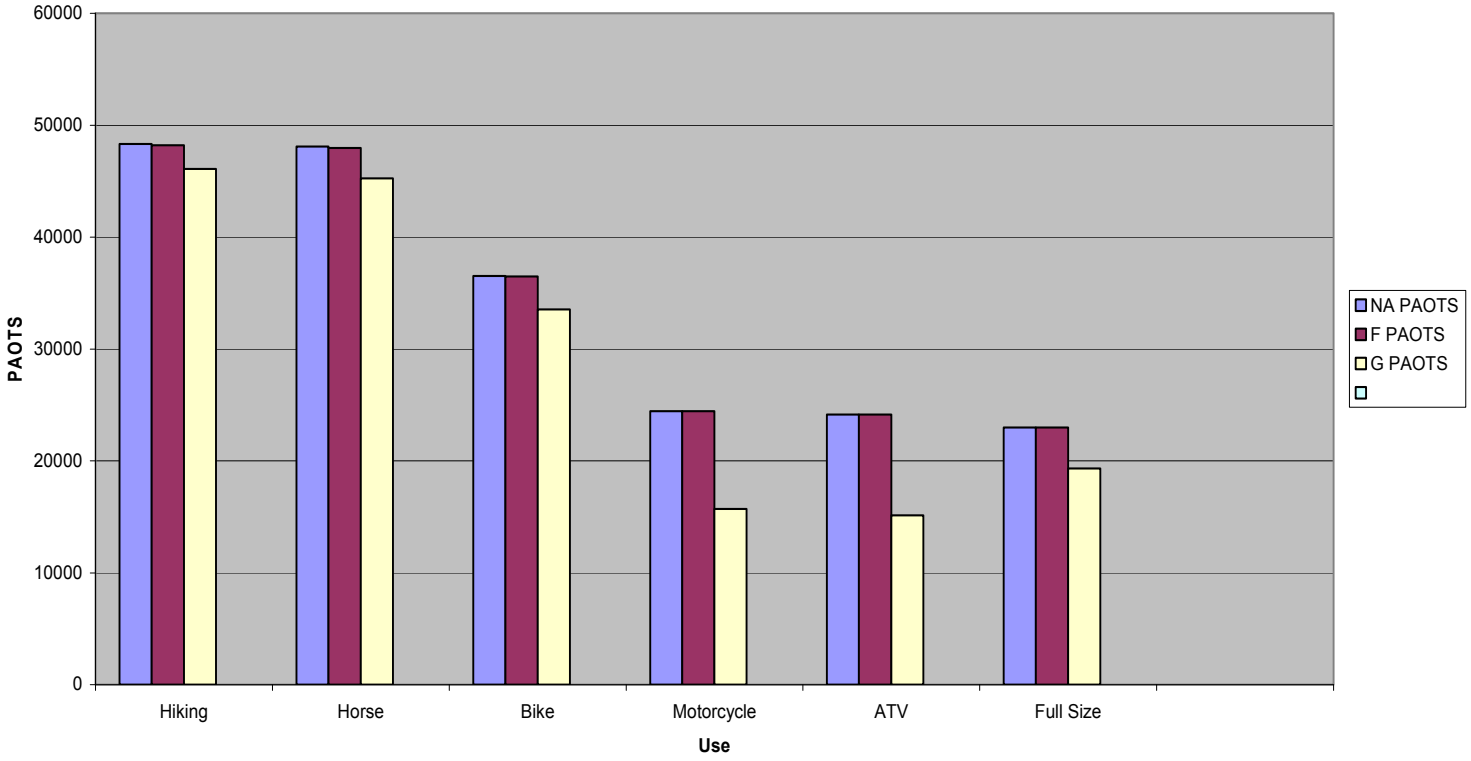
Although the total level 2 road miles drop from Alternative A to F and G, the total trail miles increase, with Alternative G offering the most trail miles of these alternatives. This is the result of converting level 2 and level 1 roads to trails and the adoption of new trails into the forest's system. While Alternative G would have the greatest total trail miles open for hikers, horses, ATVs, and motorcycles, the total trail miles open for mountain bikes is highest in Alternative F. This is due to making conscious decisions regarding which trails to allow mountain bikes on instead of a policy of allowing them on all system trails outside of wilderness, as would be done in Alternative F. Trails, such as those that only access wilderness or are unsuitable for mountain bikes, would not be designated in Alternative G.

Capacity is measured in the number of persons at one time (PAOTS) that may occupy a set distance of road/trail. In addition to looking at the total number of open miles, the number represented by capacity also takes social factors associated with crowding into account.

The capacity of urban settings is greater because physical facilities are designed and constructed to accommodate more use. The people who visit those settings also tend to be more accepting of development, managerial controls, and a higher number of other users. In contrast, people looking for solitude are not as accepting of large numbers of users or the managerial controls and development necessary to handle intensive use. Therefore, the capacity of the backcountry areas is lower.

Figure 3.10 displays the capacity, expressed in persons at one time (PAOTS), available for each use by alternative. The individual activity columns consider only the total capacity for a particular use and not other uses taking up capacity. Because many of these uses rely on a shared transportation system, the total capacity available for a combination of all shared uses would be less than the sum of adding all the individual uses. Not included in this analysis are capacities of level 3, 4 and 5 roadways. These routes are primarily considered to be for general forest access and transportation rather than a part of the recreational experience. Because these routes tend to be in areas of higher development and higher willingness of the visitor to accept less solitude, removal of these routes from the analysis does significantly lower PAOT capacities across all alternatives from those displayed in a similar graph in the first draft.

Alternative A would have the highest capacity for use on the forest. Alternative F is only slightly less for horse and hiking use than alternative A and nearly equal for biking, motorcycling, all-terrain vehicle and full size vehicle use. Alternative G has the least available capacity for use in all categories due primarily to the reduction of level 2 roads across the forest.



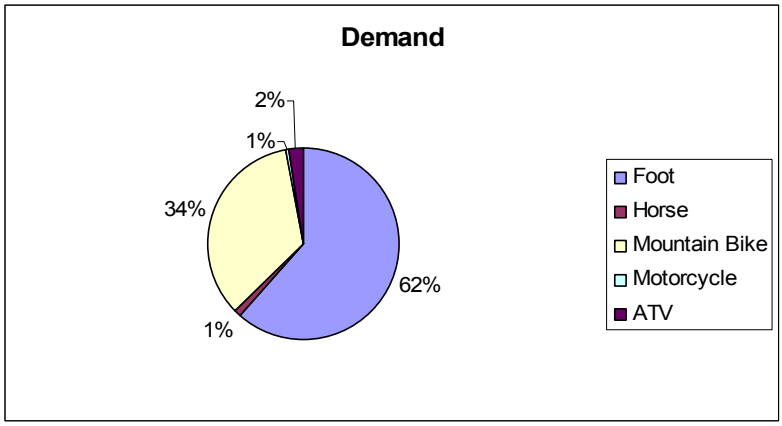
Source: White River National Forest GIS data

Figure 3.10—Capacity, in PAOTs, on roads and trails by user type. not including capacity on Level 3, 4 and 5 roadways

Supply Versus Demand

A discussion point that often arises when offering recreational opportunities is the balance of supply and demand. All users seem to argue for an equitable distribution of the available opportunities among the various user groups.

Discussions also often focus on what defines a quality experience for a particular user. While the quality of experience is a very individual and personal opinion, enough basic assumptions may be made to perform an analysis. Demand is often measured by the number of persons measured engaging in a particular activity or purchasing a particular product. Figure 3.11 is a graphical display of demand in visits as identified from actual use figures from the forest's visitor use monitoring survey in 2002.



Source: Kocis et.al. 2003, based on 2002 NVUM survey

Figure 3.11—Demand by user type

For travel management purposes, supply may be calculated using the number of miles of opportunity available to a particular user group. However, a strict measurement of all miles available does not evaluate what miles may actually be desired and used by a particular user group, nor does it take into account a balance to compare what is expected per visit by user type.

In this comparison it is assumed that for each visit a hiker will travel an average 5 miles on trails, a horseback rider 15 miles on trails, a mountain bicyclist 15 miles on trails and roads open to that use, an ATV rider 35 miles on roads and trails open to that use, and a motorcyclist 60 miles on roads and trails open to that use. For this analysis, roads of level 3 and higher are not considered to be a good recreational experience for any of the above uses, although some may be legal to travel down these routes as connectors.

Figure 3.12 gives a comparison of the supply based on average travel mileage per visit, as compared to the other use types. This is not a comparison of whether total demand for any particular use is over or under-served in total volume, but rather a comparison of the balance of opportunities available to each user group through the travel system for each alternative.

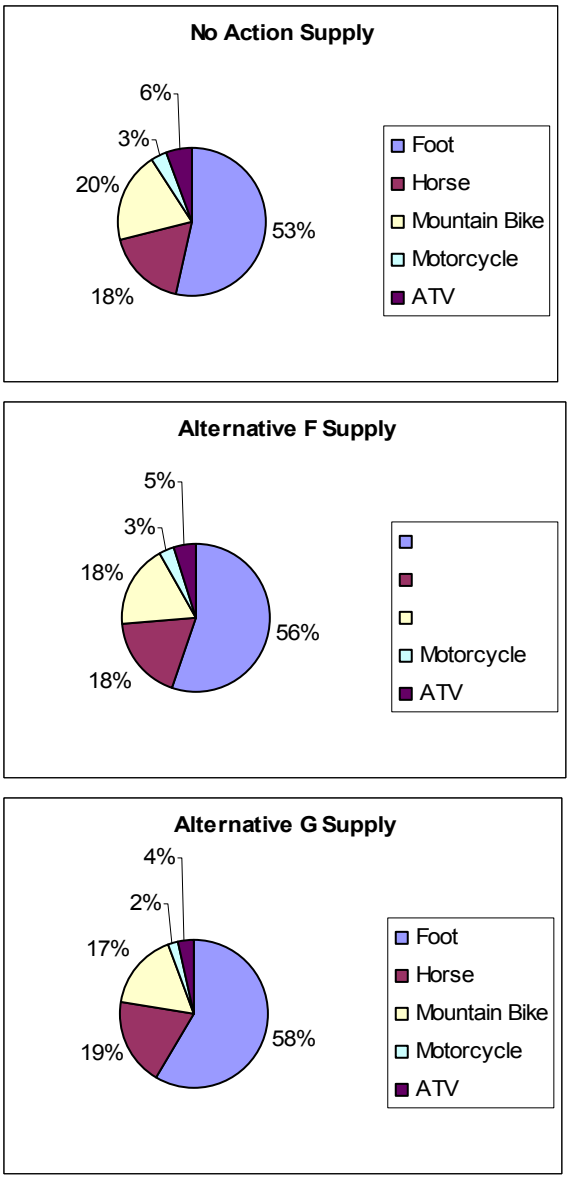


Figure 3.12—Supply balance among types by alternative

In a comparison with demand from figure 3.11, figure 3.12 shows that no alternative is close to balancing the supply and demand for all activities. However, for hiking, motorcycle, and ATV use, Alternative G comes the closest to having supply and demand meet. In this alternative the amount of supply for hiking is roughly 5 percent less than the demand, while the supply for both ATV and motorcycle opportunity is greater than current demand. Alternative A gives the largest percentage to mountain bikes, largely because it allows for mountain bikes on all trails outside of wilderness. In all alternatives, the supply for horse use greatly exceeds demand, largely because most all trails open to hiking are also open to horses.

The number of routes designated for each type of travel varies between each alternative. While each alternative will reduce existing road densities, each also strives to provide sufficient access to maintain motorized vehicle hunting access. Dispersed camping associated with hunting is only minimally affected. Camping is allowed within 300 feet

of a motorized road or trail. Known dispersed camping locations will continue to have motorized access where resource damage is not an issue.

Under the current situation, motorized access and use has increased to the point where, during the hunting seasons, animals are forced to retreat to either relatively inaccessible locations on the forest such as deep canyons or large pockets of dark timber or completely off the forest to private lands or other areas where the general public does not have access. Overall, by maintaining a limited amount of motorized access to hunting areas and by increasing the acres of wildlife habitat areas that are outside the motorized zone of influence, the overall hunting experience on the forest is expected to improve. Alternative G provides for a greater opportunity to experience hunting with less motorized conflict due to a lower mileage of level 2 routes, followed by Alternative F and Alternative A.

The forest alone does not have the resources to ensure a completely sustainable trails system in any of the alternatives presented. The Forest Service will continue to rely heavily on resources besides congressional appropriations for the operation, maintenance, and management of roads, trails, and other facilities needed to serve forest users. Unless congressional appropriations increase dramatically and keep up with increased trail use, some user groups will need to greatly increase their involvement in assisting the forest with trail maintenance. Volunteer labor, grant acquisition, or user fees can help to continue the long term availability of these routes.

Ski Area Roads and Trails, Winter and Summer

Ski area winter and summer operations are permit-dependent. In addition to the downhill ski areas, many other special-use permittees, such as resorts, outfitters and guides, huts, and owners of in-holdings, may be permitted to construct and maintain roads and trails specific to their operations (permitted routes). Many of these permitted routes may not be open to the general public.

Permitted routes generally are analyzed through processes associated with individual permits. Other than ski areas, these permitted routes are scattered across the forest and have little effect overall on travel management for the general public. The construction and maintenance of permitted routes typically are the responsibility of the permittee.

The current summer permitted routes for ski areas are the same in all summer alternatives. No permitted routes on ski areas are proposed to be added or changed in this analysis process. This analysis and decision will serve to combine and affirm previous management decisions on these routes. Any proposals for changes from the existing permitted situation will go through the ski area master development planning process as well as site-specific environmental analysis.

Winter Season

The process used for winter recreation was similar to the summer analysis process. The ranger districts performed site-specific mapping and review by resource specialists by alternative prior to compiling all site-specific data into a forest-wide analysis.

As previously mentioned, user conflicts tend to be high in winter months. Motorized and non-motorized winter recreationists use many of the same access points for their activities, and most of the area around these access points is typically open for motorized use. While the majority of both user groups do get along, the motorized users argue that cross-country skiers and snowshoers have the whole forest to recreate on. They do not consider from a practical perspective that the average cross-country skier travels less than 6 miles per visit, and that many non-motorized areas are located 10 miles or more from a

winter access point. They further argue that the skiers can access all of the terrain that is open to snowmobiles.

On the converse side, among other arguments, the skiers represent that there are few areas actually accessible that are not open to motorized use. They further argue that the effects of motorized use (largely noise), even in areas adjacent to their use area, degrades their experience.

Because all alternatives follow land allocation decisions made in the 2002 forest plan, there is no difference between alternatives in the number of acres open to motorized use. All alternatives have 1,213,800 acres available for motorized use and 1,017,700 acres in which motorized use is prohibited. Of the1,017,700 acres, 836,000 acres are in either existing designated wilderness or proposed wilderness.

The difference between the alternatives is based on acres where motorized travel is open or restricted to designated routes. Alternative A and Alternative F both have 441,300 acres where motorized use must stay on designated routes, while Alternative G has a total of 507,300 acres where motorized travel must stay on designated routes. The primary reason for restricting motorized travel to designated routes is to accommodate wildlife concerns. Also, some of the acres that were converted from open motorized to restricted to designated routes were stems from isolated parcels that were too small to accommodate open motorized travel.

Cumulative Effects

The White River National Forest continues to be the most visited tract of publicly owned land in the nation. This trend is not anticipated to change anytime in the near future and, more likely, will only continue to increase in the short-term.

Recent studies on national outdoor recreation participation showed that more than 82 percent of the national population indicated that they walk for pleasure, more than 52 percent drive a vehicle for pleasure, more than 32 percent day hike, 21 percent mountain bike, 18 percent drive off-highway vehicles, 10 percent backpack, 7 percent horse back ride on trails, 5 percent snowmobile, 3 percent cross-country ski, and 2 percent snowshoe. From 1999 to 2004 the trend was for continued increases in participation in most activities (Cordell 2004).

The 2003 Colorado Statewide Comprehensive Outdoor Recreation Plan (CDPOR 2003) identifies the top choice for recreation destinations for 50 percent of the state's population as being wilderness areas with little or no development and forests and lakes with limited trails, camping, boating and fishing opportunities. Echoing the national data trends, 74 percent of Colorado residents indicate that they have participated in non-motorized trail-dependent recreation (hiking and mountain biking) in the past 2 years, while 31 percent indicate they have participated in motorized trail recreation in that same period (CDPOR 2003).

The Federal Highway Administration and Colorado Department of Transportation have an analysis underway to determine how best to relieve the congestion on I-70 caused primarily by recreation traffic. In their analysis, they identify that 77 percent of summer recreational travelers and 70 percent of winter recreational travelers driving to the White River National Forest via I-70 are from Colorado's Front Range (USDOT/FHA and CDOT 2004). Their analysis further identifies that current recreational use is being suppressed because of traffic congestion on I-70. Future improvements to travel along I-70 could potentially increase use levels above those anticipated based on local population increases and general user participation increases.

Although most use on the forest occurs during winter months on downhill ski areas, use in the summer months continues to show the most rapid growth. Discussion in the forest plan (USDA Forest Service/WRNF 2002b) provides history and background on anticipated use and demand patterns during the next several years.

Use is increasing not only on the White River National Forest but also on surrounding public lands. When land management agencies in charge managing these areas see more impacts on the land and have to deal with more user conflict, they sometimes have to implement more regulations and restrictions on their units. The White River National Forest has had a policy of designating routes for motorized and mechanized use, where these uses are allowed, for several years. The Forest Service has adopted this policy nationwide for motorized use. The BLM is also moving toward a policy of motorized travel on designated routes for the lands they administer. Within proximity of the White River National Forest, BLM lands regulated by this policy are the Castle Peak area north of Eagle, the Roan Plateau west of Rifle, and the Red Hill area near Carbondale. Both the Colorado State Parks and National Park Service have followed more restrictive travel management policies for years.

A rising population, advancements in technology in modes of transportation, and the development of new technologies for outdoor recreation will increase the demand for additional road and trail systems on the forest. At the same time, flat maintenance budgets will continue to cause the potential for a reduction in the number and quality of road and trail miles.

Roadless Area Management

Introduction

Unroaded and undeveloped areas provide the forest with opportunities to manage for potential wilderness areas, non-motorized and limited motorized recreation, and other commodity and amenity uses. Areas that are undeveloped or roadless in nature can serve a variety of purposes, depending on what is regarded as most appropriate for the site. They can be managed as research natural areas or special interest areas, used for resource production or to provide non-motorized recreation, or, if suitable, recommended as wilderness.

The forest plan assigned a range of management areas to roadless inventory areas based on the management emphasis and resource values of each area. This section addresses the social values associated with inventoried roadless areas. Values such as wildlife habitat, clean water and air, scenery, or other resources are addressed in those specific sections.

It should be noted, since inventoried roadless areas by definition do not include constructed roads, that this travel management plan only considers the following within inventoried roadless areas:

1) designation of use on system trails (motorized and non-motorized);
2) designation of use on user-created trails (motorized and non-motorized;
3) determination of which system and user-created trails should be scheduled for decommissioning.

Conversion of a user-created trail to a system road or construction of new roads within inventoried roadless areas is outside the scope of this document and would require site-specific analysis.

Key Indicators

Key indicator: Impacts on solitude and remoteness.

Measure: Miles of system trail within each inventoried roadless area.

Measure: Miles of trail to be decommissioned within inventoried roadless areas.

Affected Environment

A current inventory and analysis of roadless areas was completed during the forest plan revision process and is detailed in appendix C of the forest plan final EIS (USDA Forest Service/WRNF 2002b), hereby incorporated by reference. The current inventory also was used in the National Roadless Area Conservation Rule of January 2001 (USDA Forest Service 2001b). In May of 2005, the Department of Agriculture, Forest Service revised 36 Code of Federal Regulations, Protection of Inventoried Roadless Areas, by adopting a new rule that established a petitioning process that will provide Governors an opportunity to seek establishment of or adjustment to management requirements for National Forest System inventoried roadless areas within their states. Currently, the Forest Service is directed to utilize the January 2001 rule. Two states submitted petitions to be analyzed, Colorado and Idaho. The Forest Service is in the process of analyzing the state petitions under NEPA. Both the 2001 rule and the 2005 rule have court cases filed for and against their provisions and use. Travel management proposed in this effort complies under both rules.

There are approximately 640,000 acres of inventoried roadless areas on the White River National Forest. Of them, 37 areas totaling 298,000 acres have been evaluated as capable and available for recommended wilderness. Ten areas, each containing fewer than 500 acres, also were evaluated as capable and available for recommended wilderness in the forest plan. Motorized and mechanized use is prohibited year-round on trails in management area prescription recommended wilderness (MA 1.2). Travel management direction for inventoried roadless areas in the remaining management areas is based on forest plan direction.

Inventoried roadless areas have a variety of values, both active and passive. Passive use values "… reflect utility derived by humans from a resource." The value of passive use includes two categories: (1) things people appreciate without actually using them or even intending to use them are called "existence value"; (2) things people want to remain available for others to use and appreciate are called "bequest values" (Gucinski et al. 2002).

Environmental Consequences

General Effects

Generally, foot, horse, and mountain bike travel in inventoried roadless areas is considered compatible with roadless area characteristics and is not viewed negatively; that type of use is not further analyzed in this section. If motorized trail use is authorized in the selected alternative, the primary short-term impact on inventoried roadless areas will be on the roadless characteristics of solitude and remoteness. The number of miles of increased motorized trail use will have an inverse relationship with solitude and remoteness qualities.

Since system roads are not found within the inventoried roadless areas, the character of the area will essentially remain undeveloped, with approximately 8-10 percent of the trails open to either all-terrain vehicle and/or motorcycle use (a few trails have system road numbers but they are managed as trails). Forest plan direction prohibits summer motorized travel in inventoried roadless areas within management areas 1.2, recommended wilderness; 1.31 and 1.32, semi-primitive non-motorized; 1.5, wild rivers; and 2.2 research natural areas.

Direct and Indirect Effects

Table 3.8—Travel system in inventoried roadless areas

	Alternative A	Alternative F	Alternative G
Miles of open motorized trails	44	44	34
Miles of non-motorized trails	461	463	440
Miles of trail to be decommissioned or rehabilitated	0	198	232

Alternative A will not help to improve roadless area characteristics. Alternative F will help to improve roadless area characteristics by actively rehabilitating trails that are not needed. Alternative G is the best alternative to improve roadless area characteristic,s as it reduces miles of motorized trails and the amount of overall trails in roadless areas. It is recognized that some system trails are necessary so that people can take advantage of recreation opportunities, and system trails can be maintained to reduce the effects of use.

While some people may feel that motorized travel detracts from roadless area characteristics, it should be noted that motorized travel, limited to ATVs and motorcycles, is allowable. In Alternative G only 8 percent of the trails in roadless areas

will allow this use. The trails identified are generally concentrated networks that have been traditionally used and are considered quality recreational opportunities.

Cumulative Effects

Effects of past road construction and development in roadless areas are minimal, and there is no new road or trail construction proposed in roadless areas in any action alternative. This analysis includes only system trails and unauthorized routes that have already been constructed; therefore, there would be no cumulative effects from additional construction.

Since all alternatives would decommission some level of unclassified routes, the overall undeveloped nature of inventoried roadless areas would improve. As local communities continue to grow and the demand for nearby recreation increases, it is likely that over time the total miles of routes both on and off forest will increase. The increase in recreation use within the forest and inventoried roadless areas will likely have cumulative effects on the characteristics of solitude and remoteness.

There are no specific proposals for further road building or development in roadless areas at this time. Project proposals in the near future, especially for forest vegetation management, minerals, and natural gas development, may affect some roadless areas. These would be analyzed in the site-specific project environmental analysis and are likely to be authorized only under a special use permit rather than open for public recreational travel. The emphasis will be on temporary roads necessary for commodity or management access. For timber, these roads tend to be in place for 3-5 years, then are rehabilitated; for natural gas and minerals, the roads may be in place for 5-30 years.

Scenery Management

Introduction

In addition to production of timber and numerous other resources, forested landscapes provide beauty, which is a valuable resource to many citizens. This resource is explicitly recognized by law. The National Environmental Policy Act requires equal consideration of aesthetics and science, and the Forest Service requires application of scenery management to all National Forest System lands. Scenic resource analysis is used to minimize the impacts on scenery by human-caused development on National Forest System lands. This section describes the scenery analysis and potential impacts that may occur due to implementation of the White River National Forest Travel Management Plan.

The forest plan establishes acceptable limits of change for the scenic resource (USDA Forest Service/WRNF 2002a). The acceptable limits of change are the documented scenic integrity objectives, which serve as a management goal for scenic resources.

Key Indicators

Key indicator: Potential visual impacts in "very high" or "high" scenic integrity objective areas.

Measure: Miles of road within "very high" or "high" scenic integrity objective areas.

Affected Environment

Scenery is an integral component of all forest settings and heavily contributes to the visitors' experience. Scenic resources vary by location and existing natural features including vegetation, water features, landform, geology, and human-made elements. All activities that forest visitors experience are performed in a scenic environment defined by the arrangement of the natural character of the landscape along with components of the built environment. Scenery combines all ecological features and human elements in a landscape to provide for our experience. The composition of these attributes is what gives a landscape its character or image. Scenery, like other natural resources, must be managed in the present to maintain quality scenery for future generations and to provide a range of experiences for a variety of users of the forest.

The report of the President's Commission on America's Outdoors (USDA Forest Service/Intermountain Research Station 1987) states that America's most important attribute for recreation is natural beauty. In surveys, Americans have repeatedly identified driving for pleasure as a favorite recreational activity. The requirement of scenic roads for this activity links scenic quality to tourism, which has become a major component of local and state economies (AASHTO 1991). Driving to enjoy scenery has been the top national recreation activity for more than a decade. The White River National Forest is the most heavily visited national forest in the nation. People who drive to view scenery account for 11 million visits annually. Scenery is an integral component of all forest settings and contributes to the quality of the users' experience. Managing a natural-appearing landscape for these visitors is important.

It is important to evaluate the management of multiple resources and possible effects associated with scenic resources. Management of multiple resources has altered the natural landscape character into the existing condition of the landscape. Management decisions are not only based on multiple use, but also on providing a range of experiences

across the forest for both motorized and non-motorized customers. The most obvious and significant effects on scenic resources are from vegetation and landform alterations. Multiple resource management activities that have altered scenic resources include but are not limited to timber management, mining, oil and gas extraction, recreational facility development including ski areas, roads and trails, campgrounds and picnic grounds, utility corridors, fire management (suppression and prescribed burning), and livestock grazing. It is important to evaluate the management of multiple resources and the possible effects associated with scenic resources. The scenery management system (SMS) provides the framework to effectively manage scenic resources within an ecologically aesthetic discipline.

The varieties of features on the landscapes of the White River National Forest provide a setting for spectacular scenery in the heart of the Rocky Mountains. The forest is composed of a diverse range of landscapes, vegetation, and water features that range from 5,500 feet in elevation to peaks towering over 14,000 feet. Foothills, mountains, plateaus, alpine peaks, and canyon lands provide a range of topography. Shrubs and grasslands, aspen and spruce-fir forests, alpine turfs, meadows, and wetlands form the vegetative mosaic of the forest. Hundreds of small lakes and ponds are scattered across the forest. Large reservoirs include Green Mountain, Dillon, Homestake, and Ruedi reservoirs, which provide an aesthetic and recreational setting in the forest. The Colorado, Eagle, White, Roaring Fork, Fryingpan, Blue, and Crystal rivers are the major streams flowing through the forest.

Large panoramic vistas can be found on several locations of the forest. Distinctive features of the landscape are experienced at a smaller scale. The diversity of scenery on the forest varies from steep canyons defined by towering cliffs that only a few visitors ever see, to the international destination of the Maroon Bells—one of the most photographed areas in the nation. The eight wilderness areas on the forest contain some of the most outstanding natural landscapes of the Rocky Mountains. Trappers Lake and the surrounding Flat Tops wild lands inspired Arthur Carhart to create the wilderness concept in the early 1900s. The Trappers Lake area is now known as the “Cradle of the Wilderness.” Mount of the Holy Cross in the Holy Cross Wilderness was the site of religious pilgrimage in the early 1900’s. The awe and wonder of the beauty of these natural wild lands is a national treasure.

Three scenic byways go through the forest. The Flat Tops Scenic Byway on the north side of the forest, the West Elk Loop Scenic Byway on the south side of the forest, and The Top of The Rockies Scenic Byway on the east side of the forest provide spectacular scenery for sightseers. The forest has such a vast array of scenic areas, they cannot all be described here. Please refer to the landscape character descriptions found in the appendix of the forest plan FEIS for more detailed information (Volume 3, Appendix P, pgs. P-1 to P-44. See also Volume 1, Topic 3, Part 4, page 3-505 to 3-512). The existing condition of the scenery resource is well-documented by the scenery management system maps found within the White River National Forest GIS system. The entire forest has been inventoried for both existing and desired future conditions. There was an extensive scenery analysis and scenery specialist report completed for the forest plan. In addition there were several scenery GIS coverages developed for the forest which were used for the scenery analysis.

The Scenery Management System (SMS) has two different landscape elements which have similar names, Existing Scenic Integrity (ESI) and Scenic Integrity Objective (SIO), but are very different. The ESI is a snapshot in time of the existing condition of the landscape. The SIO is one of the components of the desired condition for scenic quality.

Scenic Integrity Objectives are derived by combining the ESI with other landscape elements. They are expressed as forest plan objectives.

Table 3.9 shows each level of scenery and compares the acres of ESI at the time of the forest plan analysis to the SIO of the selected alternative in the forest plan. The table is included in this document to illustrate the differences in the ESI and the SIO as related to the forest. For further information on the scenery-related questions which are not covered in this report, refer to the forest plan.

Table 3.9—Acres and percentage of forest at existing scenic integrity (ESI) and scenic integrity objective (SIO)

	Existing scenic integrity level		Scenic integrity objective	
Category	Acres	Percent of forest	Acres	Percent of forest
Very high	889,000	36	544,000	24
High	549,500	22	458,000	20
Moderate	950,700	38	705,000	31
Low	38,600	2	533,855	23
Very low	46,700	2	46,000	2
Unacceptably low	7,300	>1	-*	-*

** An unacceptably low SIO is never a scenic integrity objective (Source: White River National Forest GIS data)*

The forest plan identifies 7,300 acres that have an ESI of unacceptably low as shown in tables 3.9 and 3.10. Unacceptably low can describe only an existing condition and is never a management objective. Thus, all existing unacceptably low areas must be rehabilitated in accordance with forest plan direction as forest budget allows and as project opportunities arise (USDA Forest Service/WRNF 2002b, appendix Q).

Table 3.10—Acres of unacceptably low existing scenic integrity needing rehabilitation to meet scenic integrity objectives

Scenic integrity objective	Acres of unacceptably low ESI* needing rehabilitation
Moderate	5,989
Low	1,311

** ESI = existing scenic integrity*

Environmental Consequences

General Effects

The complete travel management system is one wherein the elements of design, construction, and maintenance have been integrated to provide facilities that possess the optimum of utility, safety, beauty, resource protection, and economy. Even a well-designed travel system inevitably creates a set of changes to the local landscape, and some values are lost while others are gained. In general, roads (wider than 50 inches) cause greater impacts on the scenery resource than trails simply due to the fact that they are more visible and cause changes to landforms and vegetation.

The major impacts of roads and trails are caused by their linear configuration within the natural non-linear landscape. Limited gradients, constant road widths, traveling surfaces, and vegetation removal, which contrast in texture and color from the adjacent landscape, cause further visual impacts (Agricultural Handbook #483, National Forest Landscape

Management, vol. 2, chapter 4, Roads, p.2). Current levels of trail maintenance are generally sufficient to protect soil and stream banks, but there are potential scenic effects associated with erosion, multiple "braided" trails, and damage to stream crossings.

Different phases of road development, such as building, maintaining, using, decommissioning, or abandonment, will have widely varying effects on scenery. Dust produced by vehicles moving on unpaved roads reduces visibility. Road closures potentially can have both a negative and positive effect on scenic resources. Recontouring roads can positively influence the forest setting by reducing contrast in form, line, color, and texture. When road rehabilitation is necessary, consideration will need to be given to how the rehabilitation is accomplished and viewed from other roads, trails, and viewpoints (FEIS, Vol. 1, Topic 3, Part 4, page 3-519).

The effects of roads differ over time. Some effects are immediately apparent such as the loss of solitude or the creation of edge. Other effects may become more of a visual impact after the passage of time, such as when a large storm event causes a sudden mass movement of earthen material. Road effects also differ by landscape position and behave differently based on the topography they cross (i.e., ridgetop, midslope, and valley floor roads) (USDA Forest Service 2000, p. 5,7,13,80).

A wide variety of uses occurs on the forest. Those uses, as well as new uses, are expected to continue to increase in the future. Sightseeing and driving outdoors for pleasure are examples of activities that directly use roads as part of the recreation experience. The character of scenic views and access to the views will directly depend on the road system in place. Increasing the recreational use of areas may provide scenery benefits to a larger number of people. Altering road systems can disrupt long-established access and use patterns.

Placement, scale, class, and setting of roads can also greatly affect the quality of scenic views and access to outstanding scenic vistas. It is important to be aware of the indirect effects that roads have on the scenic resource. As demand for forest recreational opportunities continues to grow, even a stable number of forest roads and a stable condition of forest roads will likely result in increased congestion, and thus lower the quality of the experience of the scenery. (USDA Forest Service 2000, p. 61-62).

Maintaining or increasing visitor access must be balanced with maintaining the scenic integrity objective in any given area.

Direct and Indirect Effects

Both of the action alternatives have the potential to alter the existing landscape in any of the scenic integrity objectives. Changes in landscapes that have been previously altered usually are more acceptable than alterations made in undisturbed landscapes.

Alternative A and Alternative F have the highest number of miles of roads within areas with high or very high scenic integrity objectives, with 273 miles. However, Alternative G is fairly close, with 258 miles. On the one hand, providing the most roads within high or very high SIO areas can provide more viewing opportunities for a greater number of people. Conversely, limiting roads within these areas will be more beneficial to the scenery. While a smaller number of people may experience the views (such as with hikers), the views will be of a greater quality (due to less dust, congestion, and impacts on other resources such as erosion).

Alternative F provides the greatest number of miles of road open to public travel over Alternative G. However, the quality of the scenic resource (natural setting) would not be as high as in Alternative G.

Alternative G will rehabilitate more routes than Alternative F, and Alternative A will not rehabilitate any. Since Alternative G provides the most miles of road to be rehabilitated, this alternative will remove the most travel route scars on the land.

Alternative G best meets the scenery management system's underlying ecological aesthetic. Under SMS, activities which improve forest health also improve forest aesthetics, and therefore move toward the forest plan long-term desired condition. The Alternative G would best protect scenic resources, although a lower number of people would have access to the scenery.

Two trails are identified as being in need of rehabilitation in the forest plan (see table 3.10 in the affected environment section above): the Ute Creek Trail #1824, and the Oyster Lake Trail #1825. In all of the alternatives both trails are open to horses and hiking. Any travel management decision should include a provision to rehabilitate these trails.

Cumulative Effects

Management of multiple resources has altered the natural landscape character, creating the existing condition of the landscape. The most obvious and significant effects on scenic resources are from vegetation and landform alterations. Multiple resource management activities that have altered scenic resources include but are not limited to: timber management; mining; oil and gas extraction; recreational facility development (including ski areas, roads and trails, campgrounds, and picnic grounds); utility corridors; fire management (suppression and prescribed burning); and livestock grazing.

A wide variety of uses occur on the forest. Those uses, as well as new uses, are expected to continue to increase in the future. Sightseeing and driving outdoors for pleasure are examples of activities that directly use roads as part of the recreation experience. The character of scenery and access to scenic views will directly depend on the road system in place. Increasing the recreational use of areas may provide scenery benefits to more people. Alteration of road systems can disrupt long-established access and use patterns.

Placement, scale, class, and setting of roads can also greatly affect the quality of scenic views and access to outstanding scenic vistas. It is important to be aware of the indirect effects that roads have on the scenic resource. As demand for forest recreational opportunities continues to grow, the use of forest roads will likely increase in congestion, and thus lower the quality of scenery (USDA Forest Service 2000c).

The area that may be indirectly and cumulatively affected includes areas outside the forest boundary; most notably as viewed from populated areas and along heavily traveled corridors. Any activities detrimental to the scenic landscape may negatively affect the quality of the tourist experience, which is a leading industry in Colorado (USDA Forest Service 1995b). Ultimately, development of private lands (which introduces contrast into the landscape such as color, reflectivity, shape, and line) adjacent to the national forest is the greatest threat to national forest scenery when viewed from primary transportation routes and key public viewpoints (USDA Forest Service/WRNF 2002a).

Socio-Economics

Introduction

The effects of the proposed project on social and economic resources were incorporated into key issues during the scoping process. Social and economic concerns are an important consideration of national forest management, and a general discussion is included.

Volume and Type of Recreation Access

People value the ability to recreate on the forest. To participate in most recreation activities, road access is required to get to trails, access points, or recreation places. Some forms of recreation require roads to actually partake in the activity (for example, four-wheel driving and driving for pleasure). There is concern that closure of any access will limit motorized users, create crowding, and create displacement. Closure of access appears to increase non-motorized experiences, but in many cases closure of access may also make it difficult for non-motorized users to get to specific places. People are also concerned with the increase in private in-holdings that limit former access points to the national forest.

Resolution of Recreation Conflict

Roads provide access; however, once people reach their destination they expect to have a certain experience. Some want to use motorized equipment, some want to use mechanized equipment, and some seek a non-motorized experience; some prefer solitude, while others seek group settings. These differences have become apparent through public comments. Many requests for separation of uses have been made so that people can participate exclusively in one activity without conflict from other use types. Others felt that separation of uses limits all users and continues to create conflict, ill will, and territorial feeling among user groups. Some people commented that the greatest conflict occurs at shared access points and from inappropriate trail etiquette.

Key Indicators

Key indicator: Amount of recreation opportunities available to users.

Measure: Miles of roads and trails and winter use areas by user type.

Affected Environment

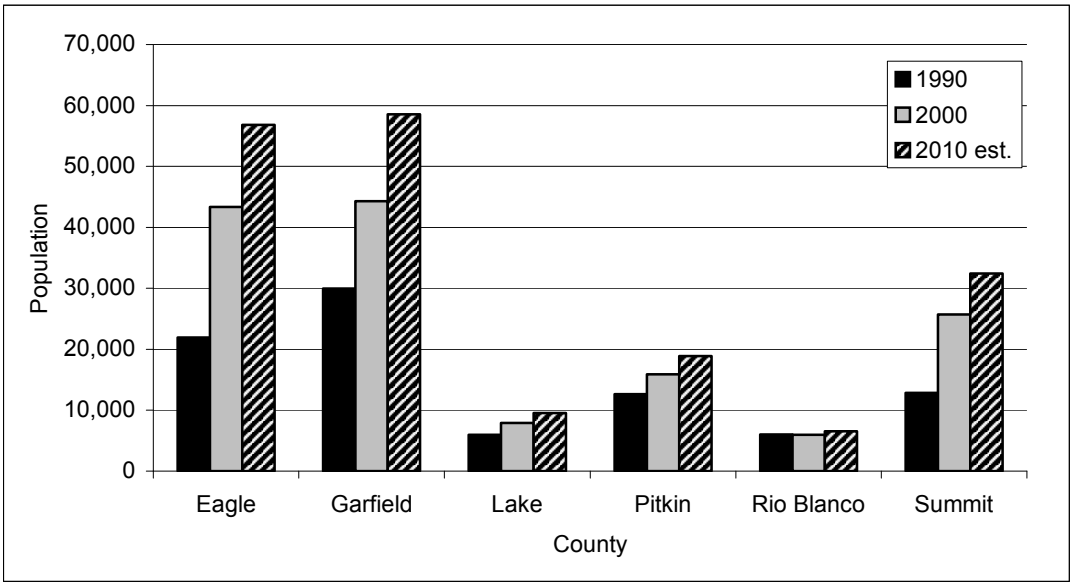
Study Area

The study area for the social and economic analysis includes six Colorado counties: Eagle, Garfield, Lake, Pitkin, Rio Blanco, and Summit. This resource report summarizes community information presented in the forest plan (USDA Forest Service/WRNF 2002b). The forest plan should be referred to for additional social and economic information.

Population

The structure of the area's population can influence the ability of the area to absorb or adapt to changes. It is important to consider any potential changes within the context of trends that are occurring outside forest planning activities.

Since 1990, the population in the six-county area has increased 60 percent, from 89,500 to 143,150; population is expected to increase another 30 percent to 182,810 by 2010 (CDOD 2004). Figure 3.13 displays the county populations for 1990, 2000, and 2010 (estimate). In the future, it is expected that the faster growing trends seen in Eagle, Garfield, and Summit counties will continue.



Source: Colorado Department of Demography (CDOD) 2004

Figure 3.13—Population by county, 1990, 2000, and 2010 (estimated)

Environmental Justice

Executive Order 12898 (February 11, 1994) directs federal agencies to focus attention on human health and environmental conditions in minority communities and low-income communities. The purpose of the executive order is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. Tables 158 and 159 of the forest plan highlight the demographic statistics for identifying potential communities of concern.

Low-income populations are more difficult to determine in the planning area because of the high cost of living, somewhat higher wages, and the many seasonal workers; normal poverty statistics are not useful in identifying those with low incomes. An analysis of housing affordability was completed as a proxy for poverty. The forest plan indicates that the proportion of relatively low-income households is probably higher than in other areas around the state.

Nine communities within the analysis area have a greater proportion of Hispanics than the statewide average. Most of these communities are home to workers who commute to the tourism centers of Vail, Aspen, and Summit County for service and retail positions. Housing as a proxy for poverty highlighted Pitkin, Eagle, and Summit counties as some of the most expensive places in Colorado to purchase a home, with Garfield County slightly above the state average, Lake County just below the state average, and Rio

Blanco County with the lowest available home prices near the White River National Forest.

Employment and Income

Employment is important to consider because one of the main functions of a region's economy is to provide jobs for residents. Personal income measures the dollars that area residents have to spend and save. The general trends in employment and income of a region put the potential impacts of changes in forest management in context of current trends and changes. In this section, general trends are outlined along with specific trends occurring in those sectors likely to be most affected by changes in Forest Service management, wood products, grazing, recreation and tourism, and mineral/oil/gas industries.

The economy around the White River National Forest is dominated by tourism. Almost 60 percent of all workers are employed in the trade and service industries. The forest plan environmental impact statement (EIS) discusses specific employment trends (USDA Forest Service/WRNF 2002b).

Per capita personal income for 2000 in the planning area on average is $35,298, similar to Colorado's average of $32,434. However, differences by county can vary remarkably. Pitkin County has a per capita income of $68,761, almost three times that of Lake County's $22,105, and twice that of those living in Garfield ($25,748) and Rio Blanco Counties ($26,039). Earnings, or income received by business owners and employees, account for a very high proportion of the income in Summit, Eagle, and Pitkin counties. A residence adjustment, however, indicates that many individuals who work in these counties take their earnings with them as they commute home to a surrounding county with a lower cost of living, such as Garfield, Lake, and Rio Blanco counties. Additional income trends are highlighted in the forest plan EIS (USDA Forest Service/WRNF 2002b).

Forest Contribution

Travel management decisions are most likely to affect tourism-related sectors, especially those involved with rental equipment or offering guided services. As highlighted in the forest plan, about 25 percent of employment in the six-county area can be attributed to Forest Service activities; most of that employment is associated with ski area activities. Direct economic impact on surrounding areas is based on users who purchase goods and services on their way to or returning from an activity on the White River National Forest. Purchases of gear and equipment made before a trip, or outside the study area, are not considered here.

Access for mining, oil and gas, livestock grazing, and wood products activities will be provided for at the project level and is not discussed further in this section.

Social Elements

Social elements are summarized in the economics affected environment section in the forest plan EIS, which includes a historical write-up for each county in the study area as well as community-specific information (USDA Forest Service/WRNF 2002b). For more specific information, please refer to the forest plan.

Lifestyle

The six counties in the study area have shared histories and are affected by the same trends, but they also are very diverse. Most of the area's development began with mining

activities, but several areas served as ranches, farms, and tourist attractions in the form of hot springs. The development of ski areas throughout the study area began a trend that continues today in the form of tourism development.

Some communities in the study area are attractive to retirees, while other communities serve as second-home locations or bedroom communities. Several communities have the most expensive real estate in the country and thus the highest housing costs in the state. The study area includes the fastest growing community in Colorado (Avon) and the second-busiest wintertime airport (Eagle, with Denver International Airport being the busiest). Interstate 70 runs through the study area, carrying recreationists from the Front Range and providing the major route for locals to move about their communities. Traffic is a year-round issue, due to recreational traffic and heavy commuting traffic between communities with affordable housing and communities with employment opportunities.

Attitudes, Beliefs, Values

For some, the value of access on the forest is directly related to personal income and jobs. Timber and non-timber production, grazing, outfitter-guide services, and special-use permits such as ski areas, all are ways people make money by using the forest. Many local businesses rely on tourists coming to the area to recreate on the forest. The ability to access and recreate on national forests is a major reason why people come to Colorado to vacation and why many decide to stay and make their living here.

The six-county area continues to be an attractive place for people to live, work, and play. Local interest groups representing various recreation user groups or environmentally concerned groups are interested and involved in forest management issues. People from outside the local area are also interested in forest management, because the White River serves as a special place for their winter vacation, destinations for weekend trips, location of a second home, or a place to which they hope to retire someday.

In recent years, with drought conditions, high fire danger, and the occurrence of several large wildfires, people are also interested in fire and fuels management on the forest, to reduce wildfire risk to their favorite places, homes, and property.

Conflict Framework

Conflicts among users of national forest resources are not simply about “competition or incompatibility between activities occurring in the same settings” (Graefe and Thapa 2004). Research into recreation conflicts emphasizes two types of conflict: goal interference conflict and social values conflict (Carothers, Vaske, and Donnelly 2001). In addition to the two types of conflicts, four factors can contribute to conflict activity: style, resource specificity, mode of experience, and tolerance of lifestyle diversity (Jacob and Schreyer 1980). Together these types and factors help to create a conflict framework that allows managers to better understand conflict and why it may occur. The next several paragraphs more fully discuss the components of the conflict framework.

Goal interference or interpersonal conflict results when a group or individual is unable to achieve recreational goals because of the activities or behaviors of others (Carothers, Vaske, and Donnelly 2001). Both groups may have the same goal but different ways of achieving it (Graefe and Thapa 2004). Goal interference can be face-to-face encounters—such as hikers encountering mountain bikers or stock users on a trail, or cross-country skiers encountering snowmobilers on a trail—that cause one group to change activities or plans because of the encounter. Goal interference also comes into play when the behaviors of one group affect another—such as cross-country skiers encountering snowmobile tracks, or noise, litter, or rowdy behavior by any group.

Goal interference conflicts often are asymmetrical, or one-way conflicts, exemplified by conflicts common to motorized and non-motorized users. Motorized users may not see any conflict with non-motorized users, while the non-motorized users feel a higher level of conflict. Goal interference conflicts can also be felt by both user groups. For example, hikers and mountain bikers may both feel their ability to achieve their recreational goals are affected by the other user group. In some cases, conflicts may exist among individuals in the same user groups—for example, hikers encountering other hikers engaging in discourteous behavior.

Goal interference conflicts are the type of conflicts that may be resolved or mitigated through management actions. One management technique used to resolve such conflicts is zoning, or a separation of uses (Carothers, Vaske, and Donnelly 2001). Separation of incompatible uses to different areas or times can address safety concerns and can provide a quality experience for recreational users.

The second type of conflict, the social values conflict, arises when different user groups or individuals do not share the same norms and or values toward resource use (Carothers, Vaske, Donnelly 2001). In this case, the point of conflict does not necessarily arise from direct encounters but may arise from people who disagree with a different user group or oppose their activity, even if that activity does not affect their experience directly. An example would be the continued opposition or conflict between hunters and non-hunters in the Mt. Evans wildlife area, even though the two uses have been separated by management (Vaske, Donnelly, Wittman, and Laidlaw 1995). People who hold different values about the hunting of wildlife may continue to oppose hunters, even if they do not come into direct contact with hunters during their activities.

Social values conflicts are more difficult to manage, because they tend to "be a reflection of one's own values and philosophies rather than a level of the conflict at the area in question" (Graefe and Thapa 2004). These social values conflicts are more likely to be resolved or improved through a common understanding of acceptable recreational uses, tolerance for these acceptable uses, and information about other user groups.

Further complicating matters are the four factors that can contribute to social values conflicts (Jacob and Schreyer 1980):

- Activity style factor: the more experience and higher skill level people have in a recreation activity, the more likely they will be to have conflict if they are unable to achieve their recreational goals.
- Resource specificity factor: the more attached people become to a recreational resource or having access to a specific area, the more likely they will have conflict if they are unable to use that area for their recreational activity.
- Mode of experience factor: the more focused and goal-oriented people are in their activity, the more likely they will encounter conflict if other groups affect their ability to meet their recreational goals.
- Tolerance of lifestyle diversity factor: the more people tend to accept or reject lifestyles different from their own, the less tolerant they are and the more conflict they will likely encounter (Jacob and Schreyer 1980).

With the increase in use of National Forest System lands and the growth in new sports and recreational activities, it seems logical to assume that conflicts among different user groups and within user groups would be on the rise. As summarized by Graefe and Thapa (2004), empirical studies found that few conflicts or problems arise when new recreational user groups are introduced into an area already used by a traditional use

group (for example, llamas in a wilderness area or snowboards in a ski area). The low level of conflict has been found to be associated with individual users and user groups using coping behaviors to reduce or eliminate potential conflict (Schneider 2000, Schneider and Hammitt 1995, Schuster 2000). Thus, while forest management can eliminate some conflicts related to goal interference, social values conflicts will likely be reduced through user group tolerance and information sharing.

Acceptable Uses

The Forest Service offers multiple uses on National Forest System lands. Not every acre is available or suitable for every use, but there is a place for most recreational uses to occur. In some cases, the Forest Service has determined that private lands are the most appropriate places for some specific activities, such as motor cross tracks; however, with management and resource protection, many recreational uses are acceptable and encouraged on forest lands. This can create some social values conflicts because not everyone values or is tolerant of recreational activities they feel are inappropriate or undesirable. These conflicts will persist unless the current and future uses of the forest are tolerated and accepted by all user groups.

Environmental Consequences

Direct and Indirect Effects

Common to All Alternatives

Volunteer activity to help maintain roads and trails throughout the forest would continue under any alternative. Volunteer groups are an important resource in management of the forest transportation system, with hundreds of hours of labor as well as capital being invested each year. Because volunteer work is not contracted and can change year to year, it is difficult to include exact cost savings by alternative associated with this work. Volunteer activity is acknowledged as an important piece of forest management and is assumed to be stable for all alternatives.

Community impacts based on road access will also continue under all alternatives. Some alternatives may see greater displacement of user groups; however, overall it is unlikely that changes in the recreational use on the forest would cause significant changes in the larger economy. Trends of recreational use on the forest are increasing (see recreation section), so the economies of communities surrounding the forest are expected to remain stable or increase under any action alternative.

Summer Season

See table 2.3 in chapter 2 for the miles open to public by use type.

Alternative A. Alternative A reflects the current situation, without adding user-created roads or trails to the transportation system. No additional management or changes would be implemented. This alternative does little to reduce the temptation for illegal activity. This alternative also makes no changes to reflect the desired conditions of the forest plan or expectations that arose from the plan decision. Because some trails do not allow motorized recreation, there is some level of separation of uses. However, no additional separation of uses would be implemented. Those conflicts that currently exist would likely continue under this alternative.

Alternative F. Alternative F reflects the current situation, without adding user-created roads or trails to the transportation system. However, changes would be implemented to

meet the parameters in the forest plan. Because some trails do not allow motorized recreation, there is some level of separation of uses. In addition, there would be slightly more separation of uses due to implementation of management area prescriptions, namely the change in management of some motorized areas to non-motorized. Conflicts may continue, especially in areas that have shared uses or areas where expectations such as solitude may be disrupted by neighboring activities. Although the forest plan creates areas of desired conditions and thus areas of potential expectations, there are still places and activities where conflicts may continue. Unless there is an increase in tolerance and acceptance of uses among all user groups, conflicts will remain.

Alternative G. Alternative G takes into account utilizing a limited but practical system to meet transportation and social recreation needs. This alternative separates some uses and meets forest plan desired conditions by creating a system that allows both motorized and non-motorized uses. It also considers adding routes that may be necessary for creating quality user experiences that were not previously legally available. There is an attempt to separate some uses by designing networks that best meet the desires of certain user types. However in doing so, and given the finite system, some users may feel displaced. Others will enjoy the experience if the network accommodates their preferred uses. Because the system cannot be overly extensive and resource values must be maintained, many locations have to be shared by different user types, and conflict may occur in these areas. The attempt to balance all uses, reduce conflict, and be respectful of the resources leads to the need to balance the volume of use with how much recreational opportunity is available. The areas with heavier use tend to be those areas where people experience conflicts. Those areas also tend to be easier to access and/or are close to the urban interface. Alternative G attempts to depict clearer expectations for experiences by showing recreationists where the various uses are allowed or not allowed. This will raise the level of expectations.

Alternative G also presents the complete picture and implications of implementing the licensed-only roads aspect of the travel rule. This does lead to more separation of use, but also reduces the area and concentrates where unlicensed motorized vehicles are allowed to go. This will likely affect those who are accustomed to using main routes to go from area to area on their unlicensed vehicles. There are still some areas that will accommodate unlicensed motorized vehicles. This could lead to better networks and expectations over time for these users.

It is hard to change user habits and where people go on the forest. Changes can occur, however, over time, especially when it is clear where people can go for a quality experience.

Winter Season

Both Alternative A and Alternative F reflect the decisions made in the forest plan for open motorized use. These decisions help to convey where motorized and non-motorized over-snow travel is allowed, restricted, and prohibited. Although the forest plan decision reduced open areas from the 1985 plan for open over-snow use, it provided for separation of use, thus a reduction in some winter user conflict. The decision will not to be revisited in this document. This document addresses what routes will be available in the restricted prescriptions so that motorized users can travel between open areas. Socially, some users did not like the changes in the forest plan, but others embraced the changes. There are still over 700,000 acres of land available for open over-snow motorized travel. For the winter season, Alternative G adds 237 miles of motorized routes through restricted areas so that motorized users can get from place to place. The limited number of access sites,

and therefore the need for users to share and disperse from the same trailheads, is the cause of most user conflict in winter.

Cumulative Effects

Changes based on economy, age distribution, and population can affect how people recreate. Colorado's population is expected to continue to grow and forest use will likely increase. The state of the economy, gas prices, food prices, and housing costs can affect how much discretionary income people have for recreation. As the population ages, some uses may increase in popularity while others may taper. Technological advances in equipment and trends also can affect what activities people choose to participate in.

Soils and Geology

Introduction

Within the variety of landscapes across the White River National Forest, erosion is the key natural process that is most likely to be influenced by travel management. Regardless of geology or soil type, compared to naturally permeable soil conditions that facilitate water infiltration, the compacted nature of trails and roads make these features more prone to runoff of precipitation and accelerated erosion.

Key Indicators

Key indicator: Erosion risk

Measure: Miles of roads and trails in moderate, moderately-high, and highly accelerated erosion risk classes.

Affected Environment

The White River National Forest has more than 200 ecological map units that describe soil types and the environmental factors that contribute to their formation. Describing each of these units individually is not practical for our purposes. To summarize these units in a concise but meaningful way, the soils section of the forest plan combined these ecological map units into more general landscape groups to reflect the forest's dominant landscapes of mountains, hills, valleys, and tablelands/mesas. The hills, valleys, and tablelands landscapes generally make up the northern portion of the forest (north of I-70), while the southern portion is dominated by mountainous landscapes. Table 17 of the forest plan FEIS (USDA Forest Service/WRNF 2002b) summarizes the geology, climate zones, dominant landforms, and potential vegetation of each group. It also includes the common range of natural erosion hazards within each group.

Environmental Consequences

General, Direct, and Indirect Effects

Roads and trails are linear, non-vegetative, compacted features that cross the landscape so that different modes of travel can be easily utilized. Although these features can add linear pathways of erosion and compacted soils, they do help to keep people on particular pathways rather than allowing them to travel everywhere and cause further compaction and vegetative destruction. In addition, properly engineered mechanisms can be constructed to help dissipate the effects. "The suitability of soil for a particular use depends on its response to that use. Suitability usually depends on one or more engineering properties of a soil. These properties are determined through the use of the physical characteristics and their interrelationships. The performance of engineering works will depend on the correct assessment of engineering properties to determine suitability and to predict performance of a soil for its intended use" (Johnson and DeGraff 1988, p. 97).

Landscape stability ratings (table 3.11) were developed by overlaying lithology, slope, and soils.

Table 3.11—Landscape stability ratings for travel routes

Alternative A			
Stability rating*	**Miles**	**Percent of routes on system or left as a footprint**	
None	168	3%	
Slight	2985	55%	
Low	1484	27%	
Moderately Low	654	12%	
Moderately High	64	1%	
High	49	1%	
Severe	27	1%	
Total	5431	100%	
Alternative F			
Stability Rating*	**Miles**	**Percent of routes rehabilitated**	**Reduction of impact/**
None	14	2%	8%
Slight	552	57%	18%
Low	273	28%	18%
Moderately Low	95	10%	15%
Moderately High	10	1%	16%
High	14	1%	28%
Severe	6	1%	22%
Total	964	100%	18%
		Percent of routes on the system	
None	154	3%	
Slight	2433	55%	
Low	1211	27%	
Moderately Low	559	13%	
Moderately High	53	1%	
High	36	1%	
Severe	21	0%	
Total	5431	100%	
Alternative G			
Stability Rating*	**Miles**	**Percent of routes**	**Reduction of impact/ percent**
None	17	1%	10%
Slight	678	57%	23%
Low	343	29%	40%
Moderately Low	133	11%	20%
Moderately High	9	1%	14%
High	12	1%	24%
Severe	5	0%	19%
Total	1880	100%	22%
		Percent routes on the system	
None	151	4%	
Slight	2309	54%	
Low	1139	27%	
Moderately Low	521	12%	
Moderately High	55	1%	
High	37	1%	
Severe	22	1%	
Total	5431	100%	

**Stability ratings are based on geologic lithology, soils, and slope. These three factors were combined and ranked from none to severe for potential erosional ground conditions, severe being the highest. The statistics are based on overlaying the alternative road and trail data with this data in GIS and calculating miles based on where the overlaps occur.*

Effects by Alternative

All alternatives have a low amount of roads and trails in the severe and high ranges. The majority of roads and trails fall within the slight to low ranges with some in the moderate ranges. Alternative A does nothing to improve the soil condition; it would not remove routes from the system or rehabiliate routes. Alternative F and Alternative G present similar percentages as to where routes will be located as far as stability of soils. They both rehabilitate routes and return them back to a natural state, thus improving the soil condition. This improvement occurs in all stability classes, with perhaps the most important occurring in severe to high classes.

Effects Common to All Alternatives

With all alternatives, trails and roads will continue to erode at rates above those of natural conditions. However, when properly maintained, erosion from trails and roads is typically reduced to acceptable levels. Additionally, erosion alone is not necessarily problematic (that is, soil productivity lost to roads typically is very small and does not exceed soil quality standards). Erosion within insufficient stream buffers is typically where erosion becomes problematic for water quality, as eroded material is more readily transported to stream courses as sediment. It is in these locations that priorities for engineering mechanisms to reduce sedimentation are necessary.

Cumulative Effects

In terms of cumulative effects, because every trail and road is not being decommissioned, all alternatives would continue contributing cumulatively to accelerated erosion from roads and trails in their respective watersheds. The alternatives that propose decommissioning and rehabilitation would have an overall reduction of roads and trails when compared to the existing condition, and would provide a reduction of risk from erosion due to roads and trails.

Roads and trails that are properly constructed and maintained will reduce erosion and water run-off. The ability to use the latest engineering methods, to set priorities based on resource needs, and to keep up with route maintenance is necessary to reduce erosion.

Timberland Vegetation Management

Introduction

Roads are a necessary element of the forest's infrastructure to access forested stands so that vegetation management treatments can occur and/or timber products can be removed cost-efficiently. Historically, forest vegetation management has concentrated on timber production in specified areas of the forest, commonly referred to as the suitable timber base.

More recently, the application of silvicultural methods has broadened to routinely address a variety of other resource objectives, such as wildlife habitat enhancement, scenery management, insect and disease infestations, and fuels reduction. Since the development and release of the 2006 Travel Management Draft Environmental Impact Statement, the forest has experienced dramatic increases in mountain pine beetle and spruce beetle infestations, prompting the need for increased forest management. As mandated by the Healthy Forest Initiative (HFI), the need to reduce the accumulation of heavy fuels and to reforest beetle-killed lands for the future has become one of the forest's highest priorities.

Forested stands without existing road access would require road construction from the project area to the nearest system road to facilitate treatment and product removal. Under special circumstances, forwarders, a ground-based yarding machine that provides for full suspension of the logs, can increase practical yarding distance and reduce the need for temporary roads. Roads for direct project access may exist short term or over the long term, depending on immediate needs or future administrative needs. However, this analysis assumes that any new road construction for timber access would be temporary and decommissioned after use. This assumption does not preclude project-specific environmental analysis from proposing the construction of new system roads.

The forest harvested an average of about 770 acres per year over the last 50 years, predominately salvage. The forest plan FEIS (USDA Forest Service/WRNF 2002b) selected alternative projects with an average annual harvest of 1030 acres over a 10 year period. Because of extensive bark beetle mortality, the number of treatment acres per year since 2005 are twice the amount projected in the forest plan, and that trend is expected to continue through 2010. However, the average annual harvest for the 10 year planning horizon as described in the forest plan FEIS is not anticipated to be exceeded.

The road system also provides public access for the collection of special forest products including posts and poles, Christmas trees, firewood, mushrooms, and transplants.

Key Indicators

Key Indicator: The amount of allowable sale quantity (ASQ) acreage that is accessible from the system roads.

Measure: Amount of ASQ acreage within ¼-mile of a road.

Key Indicator: The amount of ASQ acreage that is not accessible from the system roads.

Measure: Miles of temporary road construction required to access area of ASQ beyond ¼-mile of a system road.

Affected Environment

There are approximately 2209 miles of system and unclassified roads currently on the forest. This analysis considers the availability and location of system roads that can

accommodate a full-sized vehicle (FSV) as appropriate for logging truck traffic. There are just over 1,700 miles of system roads that can accommodate a FSV. Some of these roads do not comply with the forest plan direction (USDA Forest Service/WRNF, 2002a). In addition, there are over 1000 miles of non-system roads and trails supporting illegal access and reducing forest productivity.

This analysis considers all allowable sale quantity (ASQ) stands within ¼- and ½-mile of roads that can accommodate a full-size vehicle (FSV). The forest's suitable timber base, from which the ASQ is derived, totals just over 424,900 acres, including 156,486 acres (37%) in inventoried roadless areas that are currently withheld from timber management under the 2001 Roadless Rule.

Environmental Consequences

General Effects

Some of the system and unauthorized roads that can accommodate a full-size vehicle are redundant, and their decommissioning would not reduce access for timber management. Other roads on the forest access lands that are not suitable for timber management. Decommissioning these roads would not affect timber management.

Direct and Indirect Effects

Alternative A. Alternative A would manage 1739 miles of road and provide direct access to a total of 122,700 acres (29%) of suitable timber lands. The remaining 145,714 acres of ASQ stands would require some amount of road access to facilitate management. In addition, some 1095 miles of non-system roads and trails would remain as illegal access and a non-productive footprint on otherwise forested lands. This alternative represents the baseline for comparing the action alternatives F and G.

The 122,700 acres available for timber management within ¼-mile of roads typically require no additional roads to facilitate harvest, although short spurs may be desirable to locate the landing off a busy road for safety reasons. The 91,300 ASQ acres between ¼ and ½ mile would require, on average, ¼ mile of temporary road for access, and the remaining 54,400 acres beyond ½ of a road would require, on average, ½ mile of temporary road for access. Assuming the forest timber program averages a harvest of 1,030 acres per year in units averaging 30 – 50 acres, and the harvest units are located proportional to the proximity to a system road, an estimated 10.1 miles of temporary roads would be built and decommissioned each year to accommodate timber harvest activities.[2] The current road system is adequate for providing public access to collect special forest products.

The forest would retain over 1000 miles of non-system roads and trails. On average, 1 mile of road or trail footprint represents approximately 2 acres of lost soil productivity from compaction. While the reduction in productivity is relatively insignificant (0.2% of the acres of forest cover types on the WRNF), the indirect effect of illegal access may have a broader and adverse effect in terms of trampling newly established seedlings on thousands of acres adjacent to non-system roads and trails that have been harvested to remove beetle-killed trees.

[2] This is the average annual harvest acres projected through the 10 year planning horizon in the forest plan FEIS.

Alternative F. There is no difference in system road access between Alternatives A and F, and the number of miles of temporary road built and decommissioned each year remains the same. The road system would be adequate for providing public access to collect special forest products.

In total, 1251 miles of non-system roads and trails are proposed for decommissioning across all forested cover types on the WRNF. This represents some 2500 acres returned to productivity. Indirectly, decommissioning these "ways" may protect acres of reforestation from site compaction resulting from illegal access.

Alternative G. This alternative proposes to decommission approximately 57 miles of roads within the suitable timber base that are redundant; their decommissioning would not reduce access for timber management. In total, 1485 miles of roads and trails are proposed for decommissioning across all forested cover types on the WRNF. This represents some 3000 acres returned to productivity. Indirectly, decommissioning these "ways" may protect acres of reforestation from site compaction resulting from illegal access.

Alternative G would reduce the miles of road and would reduce the number of ASQ acres within ¼ mile of a system road to 101,300 acres. There would be a decrease in the ASQ acreage between ¼ and ½ mile of a system road to 75,300 acres, and an increase in the ASQ acreage beyond ½ mile of a system road to 91,814 acres. An additional 4.2 miles per year of temporary road, over those described in Alternative F, would be needed to facilitate timber harvest.

An increase of 4.2 miles of temporary roads each year would reduce the stumpage value of the timber sold. The amount would vary from project to project based on such factors as the number of miles proposed, the terrain, and the number of drainage crossings. The cost of building and decommissioning roads on the forest is estimated to average $3000/mile.

The road system would be adequate for providing public access to collect special forest products.

Comparison of Alternatives

The table displays the juxtaposition of ASQ acreage to the system roads, by alternative, and the miles of temporary road constructed and decommissioned each year to meet forest plan stand manipulation objectives. Alternative A (no action) and Alternative F are identical. Alternative G represents the reduced total miles of system roads and the number of ASQ acres accessible from the system roads. There would be no measurable difference between alternatives in the public's ability to collect special forest products.

Table 3.12—ASQ Acreage within ¼ and ½ mile of roads, and miles of temporary roads needed by alternative

Alt	Miles of road	Total ASQ acres	Roadless (IRA)		ASQ within ¼-mile of roads		ASQ between ¼- and ½-mile of roads		ASQ beyond ½-mile of roads & NOT in IRA		Miles of temp. road built and decom. annually
			Acres	%	Acres	%	Acres	%	Acres	%	
A	1,739	424,900	156,486	37	122,700	29	91,300	21	54,400	13	10.1
F	1,739	424,900	156,486	37	122,700	29	91,300	21	54,400	13	10.1
G	1,435	424,900	156,486	37	101,300	24	75,300	18	91,814	22	14.3

Cumulative Effects

Although the roads built to access timbered stands for harvest are temporary, during the life of the road they would add to the number of miles of road within the project area and may affect other resources. Temporary road construction would meet forest plan standards and guidelines, and the effects would be analyzed in the project environmental analysis prior to approval. Site-specific cumulative effects would be addressed at that time.

Transportation and Infrastructure

Introduction

The goal of the transportation system is to provide access to the White River National Forest for users by providing an efficient, safe, and economical system of roads and trails, while minimizing the effects to the local environment. Reasonable and well-designed access enhances opportunities for the forest visitor or user. The transportation system that currently serves users on the forest consists of approximately 2,209 miles of system roads and approximately 1,948 miles of system trails. An additional 1,095 miles of user-created roads and trails are currently inventoried. This section primarily addresses the road network and access. See recreation section for a detailed discussion on trails.

Road Network

Access to communities and to the roads that lead into the forest begins with highly developed interstate and state highways. Interstate 70 is a major east-west route across the United States that bisects the forest. Several resort communities exist in and around the White River National Forest. Many of the persons who live in these communities are here for the beauty of the area and the variety of recreation opportunities available. Due to the ease of access and overall increases and geographic shifts in population, several resort communities have grown rapidly along the I-70 corridor and along the state highways that connect to I-70, such as State Highway 82 leading to Aspen. These roads serve the local population for daily commutes as well as for access to the forest, and they continue to be upgraded to meet the increasing demand.

County roads (farm to market roads) are often connected to state highways. Many of these roads have been around since the area was first settled, and some lead directly into the forest. For the most part, county managed roads are designed to accommodate passenger cars, but may not always be paved or graveled.

Roads that exist on NFS lands may fall under several jurisdictions. Most are under Forest Service jurisdiction. These are called National Forest System roads. Forest Service roads are considered roads necessary for the administration, utilization, and management of public lands. The counties, State, BLM, or private citizens have received rights-of-way, or in some cases obtained jurisdiction over some of the roads on NFS lands. Rights that have been previously established will continue to be recognized under this document.

Functional Class

The roads on the forest are generally broken up into one of three classes, arterials, collectors, and local routes. An easy way to describe the total road network is through the description of a tree. A network is generally made up of the main route, or arterial (the trunk of a tree); the main branches off of the main route, called collectors (similar to the main branches from the trunk of the tree), and the several routes, or routes not as highly developed, that come off of the main branches, called local routes (like the smallest branches of the tree).

Arterials, the main trunk roads, are designed to handle higher volumes of traffic and to access key locations across the forest. Some may go from one community or major drainage system to another. These are generally the higher standard roads for the forest. Collectors are the intermediate branch roads that collect traffic from the local roads and connect to the arterials. They can vary in volume and standard.

Locals are roads that service end of road needs, like camping, trailheads, and general forest access. They are generally lower standard roads and receive the least volume of traffic.

Arterial road miles make up the smallest portion of the road network, followed by collector roads. The majority of the road network is classified as local roads.

Maintenance Levels

Roads are designed to handle different modes of travel. Passenger car roads require a higher degree of user comfort, thus they require higher levels of design and maintenance. These are defined by the Forest Service as maintenance level (ML) 3, 4, and 5 roads. In a memorandum of understanding (MOU) with the Federal Highways Administration (FHWA), the Forest Service agreed to manage the 3, 4, and 5 level roads under the Federal Highway Safety Act. Although the Forest Service and FHWA agree that NFS roads are not public roads per se, many are open to public travel. Open to public travel is defined as a road that is available except during scheduled periods, extreme weather, or emergency conditions; passable by four-wheel standard passenger cars; and open to general public use. Driving surfaces for these roads range from asphalt to aggregate to native surface, with the majority being native surface.

Maintenance level 2 roads are managed and maintained for use by high clearance vehicles. Passenger car traffic is not considered, and travel by a four-wheel drive vehicle is often recommended. Traffic is normally light, usually consisting of one or a combination of administrative, permitted, dispersed recreation vehicles, or vehicles travelling for other specialized uses. Maintenance level 2 roads are the backbone of the road system and make up 73% of the system (1,605 miles).

Administrative roads are defined as roads that are managed for administrative access to and within the national forest. These roads are generally closed to the public for full-sized vehicular use, and may be closed to other uses as well. These roads are generally either under special use permit, have specified easements, or are reserved for Forest Service access needs. These roads may be reserved for commodity access, private land access, or administrative access needs. Some are maintained by the special use permit holder to meet their access needs. They generally are not open to the public because of safety considerations and/or are not considered necessary for public access. If these roads were open to public traffic, the Forest Service would be responsible for the maintenance attributed to that public use. These roads range from ML 2 to ML 5, depending on operational needs.

Project roads include all roads that are managed for intermittent use. They are normally closed to use after the project is completed and the area has been returned to a natural vegetative state or are is the process of returning to a natural vegetative state (placed back into production). These roads might be put into service during a timber sale or other intermittent project need, and later taken out of service and put back into “storage”. The roads are kept in storage until a subsequent need arises. While in storage they are considered to be in a ML 1 category, where no motor vehicle access is allowed. Maintenance level 1 roads may allow other types of non-motorized access while in storage, such as horse or hiker. Those users are allowed to travel cross country, and generally on all routes, and these ML 1 roads do not need to be maintained for such use. Other ML 1 roads may be designated for use while closed (for horse, hiker, and/or bicycle) and will be maintained for that use.

Table 3.13—Current miles of National Forest System roads by maintenance level*

Maintenance levels	Miles
5	13
4	48
3	318
2	1,605
1	224

**Includes roads where ROW may occur on non-FS lands*
(Source: Alternative A, INFRA, current roads inventory)

Vehicle Classes

Historically, the forest has listed three classes of summer motorized vehicle use: full size motorized, ATV, and motorcycle. Now, with the non-highway legal vehicle differentiation, additional classes have been added and the titles and definitions of the other vehicle classes refined. The full size motorized class is now licensed motorized only, meant to include highway legal motorcycles as well as all other vehicles legal for use on public roadways under Colorado state law. The motorcycle class is defined to include highway legal and non-highway legal motorcycles. The ATV class is now motorized vehicles less than 50 inches in width, and generally includes licensed and unlicensed motorcycles and ATVs. An additional class is licensed and unlicensed (full sized vehicles, licensed and unlicensed motorcycles, ATVs, and UTVs). The changes are incorporated into the travel management plan.

User-created Roads

Sometimes referred to as “unauthorized” or “ways”, user-created routes are roads and trails on National Forest System lands that are not managed or recognized as part of the transportation system. Many of these routes are old timber, range, mining, or oil and gas exploration roads that no longer serve their intended purpose and were never properly closed or rehabilitated. Others have been created by off-road recreation use (motorized and mechanized). Many of these routes were created without due process and therefore are considered illegal.

Over the years, efforts have been made to close or rehabilitate these routes, particularly where excessive resource damage is occurring. Many of these routes are two-tracks (8 feet wide or less) and are relatively short (less than ¼ of a mile). Some provide access to dispersed camping sites or provide access to other recreational activities. Others were created by people driving off road to get to closer to a natural feature, retrieve game, or to collect firewood. Those who just like the experience of off-road driving create other routes. Mountain bike enthusiasts have also created their own trails and systems. Unfortunately, most of these user-created routes were not created with the benefit of design or construction oversight, and because they are not part of the system, they are not maintained.

Key Indicators

Key indicator: Cost of route maintenance

Measure: Miles of road to be maintained

Measure: Miles of trail to be maintained

Key indicator: Cost of routes to be decommissioned or rehabilitated

Measure: Miles of routes (system and user-created) to be decommissioned/rehabilitated

Affected Environment

Access

Historically, the roads on the forest were created mostly for commodity access, primarily mining, timber, and livestock production. Some were alternate routes connecting small communities. While roads still continue to provide access for natural gas production, vegetation management, transferring of livestock, and mine extraction, the majority of use today comes from public recreation.

Commodity

Currently, two large efforts are underway on the White River National Forest that require road access. First, due to national needs, emphasis has been placed on increasing production of domestic natural gas and oil. There is a large natural gas reserve that occurs in western Colorado, eastern Utah, and southern Wyoming. Though most of this reserve occurs on private and BLM land, portions underlie the western part of the White River National Forest. Utilization and improvements to the road system in these locations are necessary for gas well and facility access.

Second, there is a need to access the forest for vegetation management. The current mountain pine beetle and spruce beetle epidemics have prompted the need for increased forest management in lodgepole pine and spruce stands. As identified under the Healthy Forest Initiative, the need to prevent severe wildfires and manage forest lands for the future has led to the need to treat areas where tree mortality has occurred. On the White River National Forest, these areas are mostly on the eastern side of the forest in Summit and Eagle Counties, with some spruce beetle attacks occurring in the southern part of the forest. The need for treatment leads to several different vegetation management techniques requiring an efficient road network for access. Roads for direct project access may exist short term or long term depending on project needs. Many of these roads are temporary and are rehabilitated once the project is complete.

Other commodities include movement of livestock, mining extraction, and product gathering (firewood, for example), though on a smaller scale. Roads also provide access to private in-holdings and in some cases to areas for research and development. Special use permits can be issued to individuals and companies for road use and maintenance so that they can access and execute approved projects.

Roads are necessary for the Forest Service and other agencies (such as the Colorado Division of Wildlife) for administrative use and access to management activities across the forest.

When a project is initiated, the roads to and in the affected area are maintained by the industry. Many of the NFS roads are maintained or upgraded by the user to accommodate its specific needs. However, this only occurs where and when the project(s) are underway.

Recreation

The White River National Forest attracts a large number of visitors every year. Most are in the area to recreate, therefore access to the forest is critical for accommodating many recreation uses. A transportation system may serve as either a route to destination recreation or as the recreation location itself. For destination recreation, roads serve as the means to get to a drop-off point to engage in the recreation activity, such as a trail, trailhead, fishing site, picnic site, camping site, or scenic view. Where the road itself

serves as the focus of the recreation activity, users may participate in pleasure driving, four-wheel driving, motorcycling, ATV riding, biking, horseback riding, hiking, snowmobiling, and cross-county skiing.

The White River National Forest hosts 11 ski resorts under special use permit. The resorts construct roads that allow access to service resort infrastructure in the summer and that serve as snow trails in the winter. There are currently 211 miles of roads and trails serving ski area operations. The ski resorts are responsible for management of the roads and trails within the ski area permit boundary and bear management costs under their operations. Other special use permits for road use and access can be issued for outfitter and guide operations. Approximately 113 additional miles of road and 13 miles of trail are currently managed under the special use permit system on the forest.

While National Forest System roads still continue to service commodity and private inholding access, the roads have evolved primarily for recreation use and access. Tourism has become the primary industry for the area and the forest is a key component of most visitors' vacation experience. Very little direct revenue for forest service road maintenance comes from the recreation industry. The forest receives some annual congressional appropriations for maintenance and improvements.

The forest considers public access to recreational facilities and general forest areas for highway legal motorized vehicles in this document. A second component of access that needs to be considered involves whether the use of non-highway legal vehicles may also be authorized to drive to certain destinations. Often, users of the forest must rely on state, county, or local roadways to access forest roads and trails. State law prohibits non-highway legal motorized vehicle use on public roadways unless the entity controlling the roadway has made a formal declaration to allow that use (Colorado State Law, Title 33, Article 14.5).

The forest will work with the various state, county, and local road management agencies to determine where non-highway legal vehicles may be legally used on roads under the jurisdiction of these entities. Decisions in the final travel management plan will reflect the legality and practicality of non-highway legal motor vehicles being able to access areas of the forest. Consideration must be given to factors such as the availability of adequate OHV loading and off-loading areas and whether the road most likely to be used is legal even though there may be other legal options that are unlikely to be used.

Seasonal Limitations

Seasonal limitations are placed on roads to protect resources. Some of these restrictions are to protect the road itself. Most roads are native surface and vulnerable to accelerated erosion particularly during spring run-off and early fall snows. Other restrictions are in place to limit disturbance to wildlife and sensitive areas during critical times. At any time a decision-maker can issue an order to restrict access to protect users and/or the resource as necessary.

Management

The Chief of the Forest Service established an agenda called the Healthy Forest Initiative to improve the condition of National Forest System lands. The Initiative: Keeping America's forests and grasslands healthy requires restoring and rehabilitating damaged areas to: (1) prevent severe wildfires, (2) stop the introduction, establishment, and spread of invasive species, (3) reduce the conversion of forests and grasslands that leads to fragmentation of rural landscapes through subdivision, and (4) manage impacts of motorized recreation vehicles by restricting use to designated roads and trails.

Transportation systems can help or hinder the success of these initiatives. Providing well designed networks where access is needed and decommissioning roads where they are not necessary can help to achieve the goals outlined above.

Safety

The White River National Forest is the most visited national forest in the nation. While downhill skiing accounts for the majority of visits, summer use has dramatically increased in the past 20 years. In the past, use was light and originated from local communities. Today, use is heavy and much of the visitor use originates from locations outside the area. The forest visitor's ability to move around the forest is critical to accessing the many recreational opportunities available. As visitor use increases, concerns regarding safety conflicts also increase.

The forest is currently managing the road system based on the 1984 land and resource management plan and the subsequent 1985 forest supervisor's closure order. The 1985 order did not differentiate between the types of motorized vehicles on roads and this was not an issue at the time because there were very few non-highway legal motorized vehicles and drivers using the forest. The road system worked adequately when use levels were lower. Circumstances have changed significantly since 1985. Between 1995 and 2003, off-highway vehicle registrations in Colorado have risen by 223%, an average of 18% annually (SCORP, p. 15).

The general understanding of driving mountain roads has also changed during the last twenty years. Twenty years ago the majority of people traveling forest roads were from local communities and drivers were old enough to understand the inherent risks of traveling mountain roads as well as the driving techniques one should use to mitigate those risks. Today's drivers are from other areas, are younger, are unfamiliar with the mountain roads they are traveling, and are unaware of the risks associated with traveling different types of forest roads.

Adding to the increased use and the associated safety concerns are the technological advancements in the types and capabilities of vehicles used to travel forest roads. Advancements in today's OHVs allow machines to travel into more areas and with less operating skill than in the past. Today's visitor traveling in a standard passenger car may encounter full size four wheel drive vehicles, ATVs, motorcycles, mountain bikes, UTVs (utility type vehicles), and large commercial vehicles (tractor/trailer) all on the same road.

Most of the forest road system was developed for timber removal, mining, livestock grazing, inter-community connections, or for transporting people though the forest to another destination. The current road system was never designed to safely accommodate the volume of traffic we have today, nor was it designed to safely accommodate the many types of vehicles we see used today to access and travel around the forest.

Practicality & Manageability

Safety is only one factor to consider when deciding what types of motorized use to authorize on which roads. The Forest Service must evaluate many other factors when determining the practicality and manageability of a road for motorized use. In determining the practicality and manageability of a road or a system of roads, one must evaluate the following:

1) Are the regulations easy and clear for the visitor to understand the opportunities available?

2) Is the forest able to enforce motorized use regulations in the area?

3) Is the use of non-highway legal vehicles consistent with the current forest plan?
4) What does it costs to reduce or mitigate the identified safety issues associated with motorized use?
5) Does the road or system of roads provide the type or amount of recreational opportunity for a quality user experience? and
6) Does motorized mixed use on a specific forest road encourage or invite the user to violate regulations on roads under the control of other government entities?

The forest considered all these factors when deciding what types of motorized use should be allowed on a specific road or in a certain area.

Motorized Mixed Use

In the 2005 travel management rule, the agency acknowledges the need to mix highway legal and non-highway legal traffic on some National Forest System roads. These designation decisions will be advised by professional engineering studies and will include design features deemed appropriate by engineering studies. *Guidelines for Engineering Analysis of Motorized Mixed Use on National Forest System Roads* (USDA Forest Service 2005) outlines the procedures to be undertaken and factors to consider while analyzing the safety risks of authorizing highway legal vehicles (licensed) and non-highway legal vehicles (unlicensed OHV) to operate on the same road (motorized mixed use). Safety and engineering considerations are to be evaluated while conducting the motorized mixed use studies.

During 2006 and 2007, motorized mixed use analyses (professional engineering studies) were conducted on ML 3- ML 5 roads by the forest's engineering department. These roads are the forest's arterials and collectors and the main access routes that the public uses to get to the forest. Professional engineering analysis and judgment was used to evaluate the potential for a crash as well as the severity of an accident should a crash occur. The crash potential rating is based on roadway factors such as traffic volume & type, surface type & condition, sight distances, driving speeds, and roadway alignment (horizontal & vertical curves). Crash severity ratings were based on roadside conditions (natural ground slopes, slope/height of embankments, and large unyielding features next to the road), speed, and traffic types (the larger the difference in size of vehicles, the greater the severity). The forest conducted motorized mixed use analyses on approximately 246 miles of roads being considered for designation. These judgments determined that approximately 132 miles could be designated for motorized mixed use without increasing the safety risk to the public. Of the 114 miles determined to have an increased risk to public safety, approximately 60 miles included management options that could be implemented to reduce that risk to a manageable level.

Other Regulations

Other direction that directly influences road management includes:

- Federal and state laws;
- Code of Federal Regulations – 36 CFR 212, 251, and 261 (as modified by the rule);
- The MOU between FHWA and the Forest Service (as described above);
- Forest Service manuals and handbooks – 7000 series; and
- Forest plan direction.

All of these documents provide regulations that govern how roads should be designed, administered, and managed by the Forest Service. This list is not all-inclusive as the Forest Service is bound by all laws and regulations that pertain to public land management. Key elements from the travel rule, laws, and manual direction on road management implementation provide the ability for the Forest Service to be able to manage and administer NFS roads, particularly the ability of the forest to:

- Determine how to make roads safer for users, including what uses should be allowed;
- Enforce the rules imposed on the roads;
- Maintain the roads to standard, including the roads themselves and all structures related to the roads; and
- Provide gates, signs, and other information to help guide users.

Environmental Consequences

Direct and Indirect Effects

Effects of Roads Themselves

Roads evolved generally from trails to cart paths to wagon roads to accommodating motorized vehicles. In order to allow motorized vehicles, they have to be "constructed" with drainage, bridges, and pavement structures. When construction takes place, roads are no longer natural to the landscape. They require the ground to be exposed and flattened into a prism, and in some cases the roads require cut and fill slopes, ditches, water diversions (dips), culverts, outlet ditches (from water diversions), bridges, surfacing, and clearing. Because road prisms are not natural, water is often diverted from its natural paths and tends to run along the road prism, potentially causing erosion and sedimentation above levels that would occur naturally.

Features such as surfacing, ditches, culverts, dips, and outlet ditches are built into the design of roads to mitigate erosion and sedimentation and support the loads applied to the road (e.g. heavy trucks). These features are designed to get the water off the road prism frequently and as quickly as possible. Good design, construction, and maintenance of these features help to keep the effects from roads at a minimum.

User Effects (Indirect Uses)

Roads transport people to certain areas of the forest where people can disperse and participate in the recreational activity of their choice. Statistics show, however, that a majority of users recreate within ½ mile from a road or trail. Most resource-based recreation occurring in the U.S. occurs within ½ mile of the transportation system (Cordell and Bergstrom 1989). As a result, roads indirectly affect where people are going to have the most impact on the forest. Road location can help direct where people go. Provisions of certain recreation experiences help to define how and what people do in certain locations. Allowed modes of transportation on the roads help transport people to the best locations for certain experiences (see Recreation section).

Safety is also a main consideration when designing and maintaining road systems. Considerations for road use and design are based on modes of travel, amount of use, type of drivers, mixture of uses, geography, topography, soils, and weather conditions. Signs, gates, turnouts, surfacing, road widening, road realignment, speed limits, clearing,

parallel routes for different modes of travel, and allowing only certain modes of travel on a road or trail are all ways to mitigate for safety.

Within the constraints imposed by funding and other resources and priorities established by Congress and the Administration, the Forest Service does what it can to provide a safe experience for users traveling NFS roads. It is always the ultimate responsibility of the user to drive safely and follow all laws. The Traffic Control Devices Handbook (Institute of Traffic Engineers 2001, p. 30) and Geometric Design of Low Volume Local Roads (AASHTO 2001, p. xxii, and EM-7100-15 2005, p. 3-1) discuss designing roads for the prudent, reasonable, competent driver. The prudent driver can be best defined as cautious and careful, exercising sound judgment and making wise driving decisions, and considering all related circumstances before acting.

While roads can have both positive and negative impacts, there is no doubt that roads are necessary. The ability to travel by motorized vehicle is woven into the fabric of the American way. A well planned and developed transportation system can direct people to where they need to go, while minimizing impacts. The travel network should be developed within an interdisciplinary format, considering all resources (wildlife, vegetation, access, etc.). When systems are not well thought out, roads are not located in best place for minimal impacts, or they are developed where they are not really needed, duplicate where other roads go, or do not service the majority. The goal is to create a network of roads that serve the forest while minimizing impacts where and when possible. It truly is a balance between providing what is needed while lessening the impacts through amount or design.

The travel management planning effort has made a concerted effort to identify the transportation system in an effort to devise a system that is safe, economically sustainable, and environmentally sound. The road miles are reduced as a result of a multi-faceted strategy that is a combination of identifying the necessary road system, decommissioning what is not necessary, and converting roads or trails where appropriate. Some roads and trails are managed by special use permits, which places all maintenance responsibilities on the holder of the permit. Reductions in the user-created routes will be accomplished by adding routes to the road and trail system found to be important to the overall network, and rehabilitating the remaining routes.

The following tables display the miles by road and by trail for specific types of uses.

Table 3.14—Miles of roads, by use, on the White River National Forest*

Legend	Alternative A	Alternative F	Alternative G
Licensed motorized only	15	15	585
Licensed and unlicensed allowed	1724	1724	850
Motorized vehicles < 50” in width	9	1	5
Motorized two-wheeled vehicles	1	0	0
Mechanized (bicycles)	183	18	38
Foot and horse (pack animal)	117	9	38
Managed under special use permit	113	110	165
Closed to the public but remain on the system	47	46	30
Total road system	2209	1923	1711

**Does not include ski area roads*

Table 3.15—Miles of trails available, by use, on the White River National Forest*

Legend	Alternative A	Alternative F	Alternative G
Licensed motorized only	0	0	0
Licensed and unlicensed allowed	0	0	0
Motorized vehicles < 50” in width	100	108	138
Motorized two-wheeled vehicles	42	43	67
Mechanized (bicycles)	557	719	558
Foot and horse (pack animal)	1222	1335	1402
Managed under special use permit	13	15	47
Closed to the public but remain on the system	13	13	2
Total trail system	1947	2233	2214

**Does not include ski area trails*

Direct Costs

Road System

Each year the Forest Service is responsible for maintaining and decommissioning National Forest System roads across the forest.

Table 3.16—White River National Forest road work accomplishments, in miles, for the past five years

Year	Road maintenance	Road decommissioning	
		NFS roads*	Unauthorized
	----------Miles----------		
2003	587	1.7	6.8
2004	575	0	13.1
2005	635	1.5	2.8
2006	625	0	6.3
2007	578	0	10.8
5-year average	600	0.6	8.0

Source: Annual road accomplishment reports

Roads require various levels of maintenance and investment to stay functional. These levels are broken into those elements that are preformed on an annual or continual basis, and those that are referred to as deferred maintenance. Annual or continual maintenance includes surface grading, ditch cleaning, culvert cleaning, dust abatement, gravel replacement, and roadside clearing. Elements of deferred maintenance are improvements to mitigate the impacts of a road or to keep a road at its current operating level. Deferred maintenance generally involves longer lasting items such as replacement of culverts, rolling dips, signs, gates, ditches, outlet ditches, resurfacing, hardening a surface, adding turnouts, and realignment or widening of a road. Table 3.17 reflects the amount of money allocated from the budget to the forest for road construction and maintenance.

Table 3.17—Funding allocated to White River National Forest for roads (CMRD)

Fiscal Year	Amount Allocated
2004	$1,883,914
2005	$1,504,479
2006	$1,557,300
2007	$1,702,600
2008	$1,903,000
5-year average	$1,710,260

Source: White River National Forest budget work plans

Funding allocated to White River National Forest for roads (CMRD) for 2008 is slightly higher than funding in 2007. The funding increase is off-set by increased operating costs, so the 2008 increase is negligible. This funding trend is anticipated to continue at least through fiscal year 2010.

The forest has agreements with various counties whereby the counties assist in the maintenance of ML 3, 4, and 5 roads. Funding allocations are used in part to fund the forests' share of the work, and the counties receive reimbursement from the Highway Users Trust Fund. On average, the entire 379 mile system of ML 3, 4, and 5 roads is maintained each year under these agreements. The remaining CMRD dollars go toward ML 2 roads, and repair and improvements to all roads.

Other roads are maintained under project work such as a timber sale or oil and gas well exploration and development. The type and amount of project work varies from year to year and by location. Sometimes it coincides with roads heavily used by the public and there is a direct benefit, other times the projects are located in areas that sees little recreational use. Certain roads are managed under the special use permit program, which places all maintenance responsibilities on the holder of the special use permit.

Costs for Maintenance

Annual maintenance is minor road work that is done on a cyclical basis. Annual maintenance costs for local roads can range from $750 per mile for maintenance of dips and outlet ditches (minimal ML 2 requirements) to $4,125 per mile for light reconditioning of a local road. Light reconditioning includes the blading and shaping of the road and ditch, minor roadside clearing and brushing, cleaning corrugated metal pipe (culvert) inlets and outlets, and cleaning rolling dips, grade dips, and outlet ditches.

Annual maintenance costs for arterial andvcollector roads can range from $2,100 per mile for road surface grading and ditch cleaning, to $4,125 per mile for light reconditioning. Costs are higher because these roads tend to be wider, require a higher standard of maintenance, and may have aggregate surfacing.

Deferred maintenance costs for local roads can range from $4,125 per mile for light reconstruction, up to $9,625 per mile for moderate reconstruction, and to $16,500 per

mile for heavy reconstruction work. Deferred maintenance refers to road work that goes beyond the usual maintenance work done annually. This work is often required to repair roads that have deteriorated or where events such as landslides, flooding, or heavy spring runoff has affected the road condition. Light reconstruction work includes reconditioning of the roadbed, moderate roadside clearing and brushing, reconstruction or installation of dips, replacement or installation of smaller diameter culverts, and replacement or installation of signs. Moderate reconstruction includes light reconstruction work plus installation of medium sized culverts, moderate roadside clearing and brushing, turnout construction, spot surfacing with pitrun, and re-enforcing dips with pitrun. Heavy reconstruction includes all of the above plus heavy roadside clearing and brushing, adding dips and culverts, adding larger diameter culverts, plating over rocky sections, realignments, and adding fabric and pitrun material to soft sections.

Deferred maintenance costs for arterial and collector roads can range from $4,825 per mile for light reconstruction, up to $12,375 per mile for moderate reconstruction,and $20,625 per mile for heavy reconstruction. Again, the costs are higher because these roads generally contain more drainage features, require more safety features due to higher volumes of traffic, and are of a higher standard.

Other costs include gates, cattleguards, signs, aggregate surfacing, culverts, pit development, and mobilization. Depending on the amount of work, these costs can add up quickly, from $3,125 for a gate to $82,500 per mile for aggregate surfacing. Moderate to heavy reconstruction work many times requires a contract to accomplish the work. Additional contract costs include contract preparation, inspection, and administration.

Annual and deferred maintenance costs reflect what expenditures are necessary to keep roads to standard. Other costs, called capital improvements, are also necessary when the forest needs to upgrade or enhance a road. These upgrades include elements such as informational, regulatory, or warning signs; aggregate surfacing or hardening of the road surface; adding turnouts; replacing culverts with arch culverts to enhance fisheries; road widening; road realignments; and adding safety features such as guardrails. Capital improvements can be funded through additional money allocated by congress. National forests generally have to compete for this type of project funding. Policy requires contracting of any project that exceeds $50,000.

Finally, bridges and large culverts need to be considered when discussing road costs. Bridges and large culverts are considered facilities and are tracked and funded as facilities. According to current bridge and culvert inspections recorded in the Forest Service's database, there are 7 structurally deficient bridges and 13 functionally deficient bridges or large culverts on National Forest System roads in White River National Forest.

The Forest Service is also obligated to monitor road conditions and safety. Motorized mixed use analysis and road inspections can cost anywhere from $125 per mile for a basic inspection to $1,250 per mile for a full mixed use analysis.

The forest has averaged approximately 600 miles of road maintenance per year with an average annual budget of $1,710,260, which equates to an average of $2,850 per mile. Road maintenance costs, per mile, are approximately 227% higher than trail maintenance costs.

Trail System

Basics

Each year the White River National Forest is responsible for maintaining National Forest System trails across the forest. The following tables reflect the amount maintained and the funding that is budgeted for trails on the White River National Forest.

Table 3.18— White River National Forest trail maintenance accomplishments, in miles, for the past two years

Year	Trail maintenance
2006	627
2007	422
2-year average	520

Source: Annual work plan accomplishment reports

Table 3.19—Funding allocated to White River National Forest for trails (CMTL)

Fiscal Year	Amount Allocated
2006	$651,134
2007	$652,423
2008	$663,200
3-year average	$655,585

Source: White River National Forest budget work plans

White River National Forest trail funding for 2008 is slightly higher than funding for 2007. The funding increase is off-set by increased operating costs, so the increase in 2008 funding was negligible. This funding trend is anticipated to continue at least through fiscal year 2010.

Costs for Trail Maintenance

With about 2,000 miles of trails, the forest relies heavily on the use of volunteers (individuals and user groups) to assist with trail maintenance and reconstruction for both summer and winter use. In 2003, more than 37,800 hours of volunteer time in recreation and facilities programs was donated on the forest (USDA Youth and Volunteer Programs Accomplishment Report 2003). Especially during winter months, maintenance of trails is done almost exclusively through a combination of volunteer time and state grants. For example, on Vail Pass, maintenance is performed by a combination of partnerships, state grants, and recreation user fees; the Sunlight-Powderhorn winter trail system is maintained through a challenge cost-share agreement with local clubs.

Additional non-quantified assistance for trail maintenance comes from the general public and the numerous outfitters and guides on the forest, who are generally the first to travel down many of the routes in the spring following snowmelt. They often perform trail maintenance out of necessity to continue their permit operations.

A final category of people performing trail maintenance includes permittees whose permit, at least for part of the year, is centered on uses requiring trail networks. These permittees include: day use horseback ride outfitters, downhill ski areas, cross country ski areas, commercial snowmobile operations, and other outfitter/guides. Many of these routes are open to free public use, such as summer biking trails on ski areas. Conversely, some routes, such as winter cross-country ski areas in winter, may charge a

fee. Generally, these routes are authorized under a special-use permit and are not considered National Forest System routes

In addition to the use of allocated trails funding, the Forest Service also relies on other funding and labor to help accomplish trail work. The forest receives trust funds annually, amounting to 5 percent of the revenues taken in from various permits on the forest. This funding is to be used for maintenance of roads and trails and for fish passage studies as defined in the legislation for the fund.

The forest has averaged approximately 520 miles of trail maintenance per year with an average annual budget of $652,000, which equates to and average of $1,250 per mile. It costs approximately $18,000 per mile to reconstruct a trail to meet Forest Service standards. The cost to replace a trail bridge can range from a few thousand dollars for a small wilderness bridge of primarily native materials constructed by forest crews, to more than $200,000 for a design and construct contract on a larger multi-use trail bridge near urban areas. Trail maintenance costs, per mile, are approximately 44% of road maintenance costs.

Maintenance of the trail system is only one cost associated with the trails program. Other costs include: planning, trail system design and management, volunteer program coordination, tracking, and reporting.

Decommissioning

When a system road is no longer necessary, it needs to be either converted to some other use such as a trail or allowed to be returned to the surrounding natural condition. This is called decommissioning, defined as: activities that result in the stabilization and restoration of unneeded roads or trails to a more natural state. The road or trail is put back into production and permanently removed from the transportation system. The activities range from blocking the entrance, scattering debris on the roadbed (logs, rocks, branches, & stumps), or revegetating and water barring; to removing fills and culverts, reestablishing drainage-ways, pulling back shoulders, or full recontouring of the cut and fill slopes for full obliteration.

Each road that is designated to be decommissioned, whether it is a system or user-created road, needs to have some level of treatment so that it can return to a natural state. The costs for treatment methods described above range from $250 (blocking the entrance) to $10,000 per mile (full obliteration). These methods, if effective, are a one time cost. Once returned to a natural state, the impacts of the road no longer exist and no further maintenance expenditures are required.

User-created Routes

Decisions are required to determine if the 1,095 miles of user-created routes across the forest should be added to the system as roads or trails or rehabilitated and returned to the surrounding natural condition, just as in decommissioning. The forest is making a commitment in this document to evaluate user-created routes submitted by the public, and from within the agency, that may be necessary for the road or trail system. This will also fulfill the obligation to look at user-created routes as stated in the travel rule, 36 CFR 212.52. User-created routes considered for addition were examined on the ground by forest staff as funding and time permitted. These routes were reviewed to ensure that they truly are necessary and are in good enough condition to be added to the system, and to determine if they actually exist or if they have been previously rehabilitated. Approximately 157 miles have had some type of closure or rehabilitation treatment previously applied on the ground. These routes may require further rehabilitation

treatments to be effective. All routes considered unnecessary to the system, or routes that would require major construction or reconstruction work to be brought to an acceptable standard, are going to be considered unauthorized and will be rehabilitated.

All user-created routes discovered subsequent to this document will also be considered unauthorized and will be rehabilitated as directed in the forest plan. Any route proposed after the signing of this document will be considered new construction. The process for construction of a new road or trail is quite extensive. The process includes examination of the purpose and need, travel analysis, environmental analysis, surveying, design, contract preparation, contract inspection and administration, and all construction costs.

Alternative Comparison

Some roads that were designed for passenger cars are no longer able to accommodate them. Extensive road reconstruction may be necessary to bring them back to a passenger car standard. In some cases, other roads are providing passenger car access to the same destinations. In these cases, it may not be worth the continual investment to maintain a road at a passenger car standard. Some of these roads may serve better as a four wheel drive road (4WD) or even as a 4WD road with mixed use. The forest is proposing to reduce some of the ML 3 roads to ML 2 in these cases. This is one method the forest can use to reduce maintenance costs. The vast majority of the ML 3, 4, and 5 roads will remain and be maintained for passenger car use (low clearance). Maintenanace level 3, 4, and 5 roads are maintained annually by the various counties with which the forest has agreements.

Maintenance level 2 roads do vary by alternative, and therefore the costs for maintaining them vary as well. Overall, the greater the miles of road, the more maintenance dollars are necessary. The amount of funding dedicated to road maintenance has been fairly consistent and is likely to remain at current levels. The annual budget dedicated to road maintenance is not alternative-dependent. However, the number of miles of road to be maintained and how long it may take before a road gets maintained are alternative-dependent. The more roads and miles, the longer the maintenance cycle; the longer it takes before a road is maintained, the more deterioration can occur. The more deterioration, the harder it is to maintain that road, and the greater the costs that may be incurred with maintaining the road to standard.

Ideally, ML 2 roads should be maintained every three to five years. Some may require more frequent cycles, some less. Maintenance frequency is dependant on road use (type and amount), location, soils, and weather. The more roads and miles, the harder it is to maintain the schedule. Most of the ML 2 roads are maintained or improved by the forest, although a few are maintained through approved project work. On average, the forest is able to maintain approximately 180 miles of ML 2 roads per year. This can vary depending on the type and amount of work required for each road. Since the annual allocations do not meet or exceed what is necessary to be able to maintain these roads, it is assumed that these allocations will be fully spent regardless of which alternative is selected. However, the miles of road requiring maintenance and the maintenance frequency for these roads do vary by alternative. The following table displays the expected maintenance cycle by alternative.

Table 3.20—Expected maintenance cycle of National Forest System roads on White River National Forest

	Alternative A	Alternative F	Alternative G
Miles of ML 1-5 roads maintained	2,209	1,923	1,711
Miles of ML 2 roads maintained	1,605	1,457	1,224
Miles of ML 2 roads maintained annually (historically)	180	180	180
Level 2 maintenance cycle frequency (years)	9	8	7

Source: White River National Forest, GIS data and annual road accomplishment reports

The variance in maintenance cycle frequency is moderate, a 9-year maintenance cycle versus a 7-year maintenance cycle. None of the alternatives present a scenario where the White River National Forest, under current funding allocations, would be able to meet the desired maintenance frequency of three to five years. If the travel management plan developed an alternative that was based solely on allocations for roads, it would not be able meet the purpose and need to identify and designate an official transportation system on the White River National Forest that attempts to balance the physical, biological, and social values of the forest. Many of the opportunities for the public to access the forest would be shut down.

Alternative G provides a road system with the least miles (1,702) and the most favorable economic scenario in regards to system miles requiring maintenance. This alternative reduces the road system by the greatest number of miles (a reduction of 498 miles, 23 percent). Alternative F provides a road system with the second least miles (1,923) and the next most favorable economic scenario of system miles requiring maintenance. Alternative F reduces the road system by the next greatest number of miles (a reduction of 286 miles, 13 percent). The no action alternative does not reduce the existing road system at all, and therefore provides the least favorable economic scenario; this alternative has the most system miles (2,209) requiring maintenance and no reductions in expenditures.

Alternative G provides an opportunity to improve the condition of the road system, as the maintenance frequency could be reduced by 23 percent (7 year cycle verses a 9 year cycle). Alternative F could improve the road condition slightly (12 percent frequency reduction – 8 year cycle verses a 9 year cycle). Under the no action alternative, road conditions would not improve, as the maintenance frequency would remain at 9 year intervals.

If the road maintenance frequency were to remain the same (9 years), then Alternative G provides the greatest reduction in road maintenance obligations; it reduces the road system by 23 percent. This reduction could then be redirected towards other road priorities, such as maintaining roads more often, increasing maintenance on roads experiencing greater use due to increased concentrations of use, creating signage for travel management, converting system and user-created routes to system roads or trails, decommissioning system roads, and the rehabilitating user-created routes. Alternative F would have the next greatest reduction (13 percent), followed by Alternative A with no reductions.

The forest will establish priorities for roads and then decide which items (maintenance frequency, signage, decommissioning, rehabilitation, conversion of routes, etc.) is the priority, on which roads, and in which areas.

Trail System

Table 3.21—Expected maintenance cycle of National Forest System trails

	Alternative B	Alternative C	Alternative D
Miles of trail maintained	1,948	2,234	2,214
Miles of trail maintained annually (historically)	520	520	520
Trail maintenance cycle frequency (years)	3.75	4.30	4.25

Source: White River National Forest, GIS data and annual road accomplishment reports

The maintenance frequency variance is even less for trails than for roads. If the travel management plan developed an alternative that was based solely on allocations for trails, it would not be able meet the purpose and need to develop a transportation system to meet an increasing demand for recreational travel opportunities and to provide a spectrum of quality experiences for a wide variety of forest users."

As with roads, the greater the miles of system trails, the more funds the forest will need to maintain that system. The no action alternative provides the most favorable economic scenario with the least amount of trail miles to maintain (1,948). Alternative F provides the least favorable economic scenario with the greatest number of miles to maintain (2,234 miles, an increase of 286 miles or 15 percent). Alternative G provides a slightly more favorable economic scenario than Alternative F; it results in only 20 fewer miles of trail to be maintained (2,214 miles) by increasing the trail system by 266 miles, or 13 percent.

To maintain the proposed trail system, allocations would need to increase by 15 percent for Alternative F and 13 percent for Alternative G. The forest can also decide to extend the maintenance frequency to 4.30 years, which would not require an increase in trail allocations.

As with roads, the forest will need to establish priorities for trails and then decide which items (maintenance frequency, signiage, decommissioning, rehabilitation, conversion of routes, etc.) is the priority, on which trails, and in which areas.

Decommissioning/Rehabilitation

One of the objectives of travel management planning is to identify a transportation system (roads & trails) that is truly necessary and to decommission the remaining system roads and trails that are no longer needed. It is also important to rehabilitate user-created roads that are not incorporated through the travel management planning process. For this discussion, decommissioning and rehabilitation are defined as: activities that result in the stabilization and restoration of unneeded roads or trails to a more natural state. The road or trail is put back into production and permanently removed from the transportation system. Decommissioning/rehabilitation can be accomplished through various methods such as physically obliterating the route, recontouring, scarifying, seeding, blocking the route entrance, or slashing in the route with logs and rocks. Many factors go into the amount of work needed for decommissioning/rehabilitating a route. While each route will vary in cost for decommissioning/rehabilitation, the more miles to decommission/rehabilitate, the more funding that will have to be dedicated to the effort. Some routes may have already been decommissioned/rehabilitated, however these efforts may not have been effective, and further treatment may be necessary. Table 2.4 in Chapter 2 provides a summary of the miles of roads and trails to be decommissioned or

rehabilitated. Alternative G has the greatest miles of routes to be removed from the transportation system (1,483 miles), followed by Alternative F (1,252 miles). Alternative A would remove no miles. Therefore the costs for decommissioning/rehabilitating would be greatest in Alternative G, followed by Alternative F, with no costs associated with Alternative A. It is important to remember that route decommissioning/rehabilitation, if effectively done, is a one-time cost. The benefits associated with this effort are a reduction in resource impacts that unnecessary routes may have on the land.

Summary of Costs

The following table displays the relative cost rating for each alternative relative to the transportation system identified. Each transportation cost comparison was assumed to be of equal importance and value. The lower the numerical value, the lower the anticipated cost impact.

Table 3.22—Relative cost rating for each alternative for transportation system activities

	Alternative A	Alternative F	Alternative G
Indicator: Cost of route maintenance			
Measure: Miles of road to be maintained	3 (2,209 mi)	2 (1,923 mi)	1 (1,711 mi)
Measure: Miles of trail to be maintained	1 (1,948 mi)	3 (2,234 mi)	2 (2,214 mi)
Indicator: Cost of routes to be decommissioned or rehabilitated			
Measure: Total miles of routes to be decommissioned/rehabilitated (system and user-created)	1 (0 mi)	2 (1,252 mi)	3 (1,483 mi)
Total Score	5	7	6

From a strict transportation system viewpoint, Alternative A, the no action alternative, has the least total impacts relative to cost, namely because there are no roads or trails to decommission or rehabilitate. Alternative A has the greatest miles of road requiring maintenance, but the least miles of trail requiring maintenance. It has the same overall total transportation system mileage as Alternative F, but Alternative F has slightly more trails and fewer roads than Alternative A. Alternative A does not meet the direction of the current forest plan and does nothing to meet the intent of the travel rule, as it fails to address any of the 1,095 miles of identified user-created routes on the forest.

Alternative F has the highest costs relative to the other alternatives. Alternative F has the second greatest miles of road requiring maintenance and the greatest miles of trail requiring maintenance. This alternative has the same total transportation system mileage as Alternative A, but with slightly less road mileage and slightly more trail mileage. This alternative would have the second highest decommissioning/rehabilitation cost. Alternative F reduces the total road system miles by the second greatest amount (286 miles, 13 percent), while increasing trail system by 286 miles, a one to one ratio of road reductions versus trail increases. Alternative F minimally complies with the current forest plan, and partially meets the intent of the travel rule by rehabilitating all identified miles of user-created routes. Alternative F does not add any user-created routes to the transportation system or decommission any system routes that are no longer needed.

Alternative G is second in terms of cost impacts. This alternative has the least miles of road requiring maintenance (1,711) and the second greatest miles of trail requiring maintenance (2,214). It has the least amount of total transportation system miles, 3,916 miles, which is 241 miles less than Alternatives A and F. Alternative G does have the

highest decommissioning/rehabilitation costs, as it treats a total of 1,483 miles of system routes. Alternative G reduces the total road system miles by the greatest amount (498 miles, 23 percent), while increasing trail system by 266 miles – almost a two to one ratio of roads decommissioned verses trails added. This alternative fully complies with the current forest plan and fully meets the intent of the travel rule. Alternative G is the only alternative that adds user-created routes (road, trail, historic) to the system. Alternative G provides a transportation system that best meets the needs of the forest. It creates the smallest transportation system of the three alternatives and eliminates more duplicate, unnecessary, and user-created routes than other alternatives.

Each of the alternatives, including Alternative A – no action, would cost more to implement than the current forest travel management budget. The current budget does not provide enough road maintenance and decommissioning funding to fully implement management needs. Unless routinely maintained, roads can deteriorate to a condition where travel becomes difficult, or where drainage structures no longer function properly, thus affecting other resources such as water quality. Additional funding would then be required to bring the road back to standard.

Cumulative Effects

A route identified for decommissioning is no longer needed for access. Returning the route to a natural state helps to prevent illegal use, reduce further resource damage, and mitigate unnecessary wildlife fragmentation. However, it does take funding to accomplish this. One of the factors in deciding the method for decommissioning will need to be the amount of available funding.

Over time and as funding permits, the travel management plan will be implemented on the ground. Travel management and motorized mixed use signage will allow the public to easily identify which modes of travel are allowed on which roads and trails. Decommissioning/rehabilitation of system and user-created routes will reduce the on-the-ground transportation system and actual route miles, as well as the associated maintenance costs. System and user-created routes will be converted to other uses (roads or trails), further reducing the system miles and the environmental impacts.

The forest will continue to evaluate the road and trail system in an effort to provide a safe, economically sustainable, and environmentally sound transportation system that provides the user with a quality experience. The forest will also continue to evaluate roads designated for motorized mixed use as traffic increases on these roads due to the emphasis on motorized recreation on certain roads and in certain areas.

The transportation system will continue to evolve in an effort to meet future access needs for commodities and access to recreational opportunities across the forest. On the commodity side, oil and gas production, mining, and timber harvesting will continue to use the existing road system and most likely will expand the current system. When new roads are developed, the Forest Service will decide the best location, whether they should provide temporary or permanent access, and the best way for the roads to serve not only the individual commodity need, but the overall access needs of the entire area.

As local communities continue to grow and as tourism continues to increase, more people will come to the area to visit and recreate. Projects such as the I-70 expansion and local airport expansions will make it easier for people to visit the area. The easier it is for people to visit and recreate on the forest, the greater the demand on the transportation system. This increased demand will lead to increased maintenance needs.

In order to resolve access objectives, additional analysis and decision-making may be required on specific routes and facilities. When the forest opts to resolve an access goal or is faced with an outside opportunity to resolve access goals, design and execution parameters will be developed.

Watersheds

Introduction

Healthy watersheds are critical to protecting water quality, sustaining dependent ecosystems, providing a reliable water supply, and preventing or reducing the downstream impacts of high-runoff events. In a natural state, watersheds are in a dynamic equilibrium determined by geologic and climatic variables. Significant disturbances, whether caused naturally (such as by landslides, stand-replacement fires, or floods) or by human impacts (such as travel management activities) can throw a watershed out of equilibrium. When healthy, an affected watershed can recover from such disturbances given sufficient restoration of vegetative cover. However, chronic impacts where mitigation measures are either not applied or inadequate can severely impair watershed recovery and can affect the long-term health of watershed resources as well as their benefits to ecosystems and human settlements.

Watersheds are areas of land that drain rainfall and snowmelt into a common stream, stream network, or body of water. A system of describing watersheds in terms of scale was developed by the U.S. Geological Survey, dividing them into progressively smaller nested watersheds with the first level being the largest land area relative to watersheds of successive levels. Each level is identified systematically by a hydrologic unit code number (HUC). The term HUC, level, and field often are used interchangeably. However, 4th-level watersheds are often called sub-basins; 5th-level watersheds are simply referred to as watersheds; 6th-level watersheds are known as subwatersheds; and 7th-level watersheds are called catchments.

Because the forest covers a broad range of terrain that varies in natural and human-caused land disturbances, the affected environment section here looks at the current condition of six geographic areas that roughly correspond to 4th-level HUC sub-basins. For the environmental consequences section, impacts of roads within each 7th-level HUC catchment were analyzed.

Key Indicators

The analysis for watershed health is specific to the impacts of maintenance level 1 and 2 roads on watershed resources at the 7th-level or catchment scale. Because maintenance level 3, 4, and 5 roads would not vary by alternative, they are not considered as factors in rating one alternative over the other; however, they are considered in the overall effects of the alternatives. The overall condition of each watershed (as determined for the forest plan[3]) will be considered along with the following:

Key indicator: Impacts on watersheds from the quantity of roads and trails

Measure: Road/trail density by watershed

Key indicator: Road interference with stream flow

Measure: Road-stream crossing density

[3] In the forest plan, a broad-scaled watershed condition assessment was conducted for 6th-level subwatersheds on the forest. Since then, the boundaries of many subwatersheds were revised to describe larger basin areas. Some watersheds that were identified in the forest plan as 6th-level subwatersheds are now 7th-level catchments. In addition, the watershed condition assessment was based on human and natural disturbances that do not affect or are not necessarily affected by roads.

Affected Environment

Authorized roads within the White River National Forest total about 2,610 miles. In addition there are 1,095 miles of user-created, unauthorized roads and trails on the forest. The extent of adverse impacts of an individual road depend on numerous factors such as geology; proximity to streams, wetlands, or riparian areas; level of maintenance; and use rate. While best management practices are required for all road construction and maintenance, the risk of adverse impacts on watershed resources grows with road miles.

Watersheds Evaluated

The White River National Forest forms the headwaters of the Blue, Eagle, and Roaring Fork rivers, all of which are direct tributaries to the Colorado River. Portions of the forest also lie within the headwaters of the White, Yampa, and Piceance-Yellow rivers, tributaries to the Green River. All roads administered by the forest are located within the headwaters of the Colorado River basin.

Because the forest covers a broad range of terrain that varies widely in natural and human-caused sensitivities to watershed disturbances, further description of watersheds is provided in terms of six geographic units (figure 3.14). These units roughly represent 4th-level watersheds, or sub-basins, on the forest, each with a unique set of resource management issues.

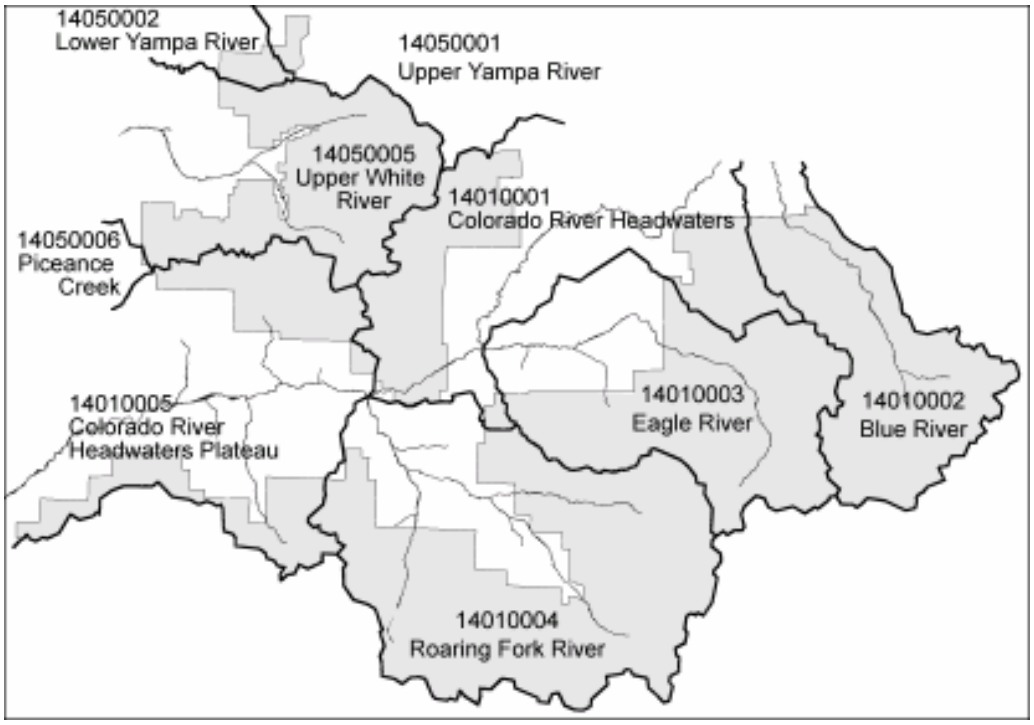


Figure 3.14—Fourth-level sub-basins on the White River National Forest, according to USGS hydrologic unit codes (HUCs)

Surface waters

Water resources on the forest include streams, wetlands, riparian areas, lakes, ponds, and reservoirs. They contribute significantly to public water supplies and to agricultural and recreational uses. They also support habitat for fisheries and wildlife and contribute to aesthetic values important to many forest users.

There are approximately 2,690 miles of perennial streams and 9,270 miles of intermittent streams on the forest. Open water comprises about 11,500 acres. An estimated 50,900 acres of riparian/wetland communities are associated with these surface waters.

Public Supply Watersheds

While most municipal use of forest water is provided to eastern slope users, western slope use has increased along with this area's population. No designated public supply watersheds are located on the forest. There are 40 watersheds on the forest that, although not officially designated as public supply watersheds, do supply water for municipal use (table 3.23). With two exceptions, road impacts have not been identified as water quality concerns in these watersheds. The exceptions are Straight Creek and Black Gore Creek; these public supply watersheds are both affected by sedimentation resulting from traction sand from I-70. The Forest Service is working with the state departments of Public Health and Transportation and with local governments to reduce sanding impacts on these creeks.

Table 3.23—Watersheds on the White River National Forest that supply water for municipal use

Name	Area served	White River National Forest district
Hunter Creek	Aspen	Aspen
Castle Creek	Aspen	Aspen
Maroon Creek	Aspen	Aspen
Snowmass Creek	Snowmass	Aspen
Roaring Fork River	Aspen	Aspen
White River	Meeker	Blanco
Straight Creek	Dillon, Dillon Valley	Dillon
North Tenmile Creek	Frisco	Dillon
North Fork of the Snake River	Arapahoe Basin Ski Area	Dillon
North Fork of the Snake River	Loveland Pass Village	Dillon
North Fork of the Snake River	Keystone	Dillon
Lehman Gulch	Breckenridge Ski Area	Dillon
North Fork of Cucumber Gulch	Blue River Water District	Dillon
North Fork of South Barton Gulch	Blue River Water District	Dillon
Cucumber Gulch	Blue River Water District	Dillon
Indiana Gulch	Breckenridge	Dillon
West Tenmile Creek	Copper Mountain	Dillon
Fryingpan River	Basalt	Sopris
Nettle Creek	Carbondale	Sopris
East Creek	Redstone	Sopris
North Fork of the Crystal River	Crystal	Sopris
Carbonate Creek	Marble	Sopris
Brush Creek	Eagle	Eagle
Mosher Creek	Gypsum	Eagle
Resolution Creek	Camp Hale	Holy Cross
Fall Creek	Gilman	Holy Cross
Cross Creek	Minturn	Holy Cross

Name	Area served	White River National Forest district
Turkey Creek	Redcliff	Holy Cross
Beaver Creek	Beaver Creek Ski Area	Holy Cross
Booth Creek	Vail	Holy Cross
Gore Creek	Vail	Holy Cross
Black Gore Creek	Vail	Holy Cross
Mill Creek	Vail	Holy Cross
Grizzly Creek	Glenwood Springs	Rifle
No Name Creek	Glenwood Springs	Rifle
East Elk Creek	New Castle	Rifle
Beaver Creek	Rifle	Rifle
Oasis Creek	West Glenwood	Rifle

Water Quality

Water quality within the forest can be affected by natural and/or human-caused factors. The primary water parameter of concern related to travel management is sedimentation originating from road erosion. The underlying geology can play a significant role in determining the impacts a road or trail has on erosion. In some areas, additional water quality concerns include water temperature (from the significant loss of riparian vegetation from roads constructed adjacent to streams and water bodies) and salinity (from the application of road salts for de-icing or dust abatement purposes).

The State of Colorado reports biannually on the status of water quality. The most recent report indicates that two stream segments that occur within the forest, Straight Creek and Black Gore Creek, are impaired because of sediment from I-70 (CDPHE 2004). No other stream segments on the forest are identified as impaired because of road runoff.

The State of Colorado also has identified stream segments where no degradation of water quality is allowed. These are called "outstanding waters," two of which occur within wilderness areas on the White River National Forest:

1) White River Basin–Segment 2: Trappers Lake, including all tributaries to Trappers Lake;
2) Roaring Fork River–Segment 1: All tributaries to the Roaring Fork River system, including all lakes and reservoirs, within the Maroon Bells-Snowmass Wilderness and the Hunter-Fryingpan Wilderness.

Wetland and Riparian Areas

Roads can affect wetlands and riparian areas directly or indirectly through changes in hydrology. Modification of surface and subsurface drainage can result in changes in moisture regimes of these areas. Road proximity can also affect water quality in wetlands and riparian areas.

There are 50,864 acres of mapped riparian and wetland areas on the forest. Although riparian and wetland areas occupy only about 2 percent of the lands managed by the White River National Forest, they are key to productive fisheries and wildlife habitat; they attenuate flooding; and they provide quality water for downstream users, continuous ground water recharge, and diverse scenery and recreation sites. Riparian and wetland areas also are important to sustaining timber and forage production.

Riparian ecosystems constitute the transition area between the aquatic ecosystem and the adjacent terrestrial system. The aquatic ecosystem includes the stream channel, lakebed, water, and the biotic communities and habitat found in these features. Wetlands in these

areas are inundated by surface or groundwater with a frequency sufficient to support vegetation or aquatic life that requires saturated or seasonally saturated soil conditions. Wetlands generally include marshes, bogs, wet meadows, river overflows, mud flats, and natural ponds. Executive Orders 11988 and 11990 direct federal agencies to avoid the loss of wetlands on federal lands.

Geographic Units

A manageable perspective on the watershed conditions on the forest is presented in terms of six geographic units, which generally are based on 4th-level watersheds, or sub-basins (figure 3.13). These six units are:

- Blue River;
- Eagle River;
- Roaring Fork River;
- Upper Colorado River;
- Lower Colorado River; and
- Upper White River.

The following descriptions include the amount of surface water and wetlands in each geographic unit. Road densities and stream density are included, as are human and natural elements of risk to watershed health. The greater the density of roads, the greater the risk of adverse watershed impacts. Stream density is an important indicator of the efficiency through which a stream system receives pollutants.

Blue River Unit. The Blue River unit is located entirely within the Dillon Ranger District. Within the unit are 590 miles of perennial streams and 890 miles of intermittent streams. Lakes and ponds occupy 3,760 acres; there are 9,760 acres of wetlands and riparian areas. About 19 percent of the riparian/wetland communities that occur on the forest are found in the Blue River basin.

Stream density is 3.1 miles per square mile. Ten streams on the forest contribute to 12 public water supply entities.

Physiographically, most of the Blue River unit is composed of high-relief, crystalline, and hard-sedimentary mountainous lands. The soils in these lands have a moderate-to-severe erosion hazard. Along the course of the Blue River, the lands fall into low-relief, mixed-sedimentary mountainous lands. The erosion hazard in these lands ranges from low to severe.

Eagle River Unit. The Eagle River unit represents the National Forest System lands that occur within the Eagle River basin, a 4th-level watershed (sub-basin). Lands within this unit fall within the Eagle and Holy Cross ranger districts. Within the unit are 570 miles of perennial streams and 1,320 miles of intermittent streams. Lakes and ponds make up 1,360 acres; wetlands and riparian areas occupy 9,050 acres. About 18 percent of the riparian/wetland communities that occur on the forest are found within the Eagle River basin.

Stream density is 3.4 miles per square mile. Eleven watersheds within this unit are a source of water for eight municipalities.

Three physiographic units are found within the Eagle River unit. The high-relief, crystalline, and hard-sedimentary mountainous lands are generally found within the Eagles Nest and Holy Cross wilderness areas. Soils in these lands have a moderate-to-

severe erosion hazard. A relatively small area around Muddy, Red Canyon, and Cache creeks, located within the northern part of the Eagle River unit, is low-relief, soft-sedimentary mountainous and volcanic mesa lands. Soils in this physiographic area generally have low fertility with a severe limitation for revegetation. Their erosion hazard potential is severe; mud and debris flows can be common occurrences. The remaining area within the Eagle River unit are lands that fall into low-relief, mixed-sedimentary mountainous lands. The erosion hazard in these lands ranges from low to severe.

Five stream segments identified by the Colorado Department of Public Health and Environment are designated "use impaired" (CDPHE 2004). Degradation of water quality in two of these segments is attributed to sedimentation resulting from road-sanding operations on I-70.

Roaring Fork River Unit. The Roaring Fork River unit represents the National Forest System lands that occur within the Roaring Fork River basin, a 4th-level watershed, or sub-basin. Lands within this unit fall within the Aspen and Sopris ranger districts. Within the unit are 710 miles of perennial streams, 2,750 miles of intermittent streams, 2,200 acres of lakes and ponds, and 11,160 acres of wetlands and riparian areas. About 22 percent of the riparian/wetland communities that occur on the forest are found within the Roaring Fork River basin.

Stream density is 3.8 –miles per square mile.

Five physiographic units are found within the Roaring Fork River unit. Most of the unit is composed of high-relief, crystalline, and hard-sedimentary mountainous lands that are generally found within the headwaters portions of the watershed. Soils in these lands have a moderate-to-severe erosion hazard.

Much of the lower Fryingpan River area and the valley portions of the Crystal River are high-relief, mixed-sedimentary mountainous lands. The erosion hazard of soils in these areas is generally moderate-to-severe, with mud and debris flows common in areas with steep, barren slopes. Soil fertility ranges from low to high and the limitation for revegetation ranges from slight to severe. Avalanche Creek annually sees mudflows substantial enough in size to close the access road into a campground.

The area around Marble, as well as along the lower slopes of the Elk Mountains, falls within the low-relief, mixed-sedimentary mountainous lands. There are a variety of soils here due to sedimentary formations as well as glacial and landslide deposits. Ratings for erosion hazard, soil fertility, and revegetation limitation vary widely. A few relatively recent and significant mudflows have occurred in the Marble area, most of which have originated within the Carbonate and Slate Creek basins (Rogers and Rold 1972).

The area around Basalt Mountain, as well as the upper reaches of Fourmile and Thompson Creeks, is low-relief, soft-sedimentary mountainous and volcanic mesa lands. Soils in this physiographic area generally have low fertility with a severe limitation for revegetation. Their erosion hazard potential is severe; mud and debris flows can be common occurrences.

The lower reaches of Fourmile and Thompson Creeks, as well as Coal Creek, are within strongly dipping, soft-sedimentary mountainous lands. These lands generally have poor stability. Soils typically have severe erosion hazard ratings with mud and debris flows common. Soil fertility is low-to-moderate and has a severe limitation on revegetation.

Upper Colorado River Unit. The Upper Colorado River unit represents lands managed by the White River National Forest that occur within the Upper Colorado River basin to Glenwood Springs, excluding the Blue, Eagle, and Roaring Fork river basins. Lands

within this unit fall within the north portion of the Holy Cross Ranger District, the northwest portion of Eagle Ranger District, a small northwest segment of Sopris Ranger District, and an eastern portion of the Rifle Ranger District. Within the unit are 330 miles of perennial streams, 1,050 miles of intermittent streams, 1,560 acres of lakes and ponds, and 8,060 acres of wetlands and riparian areas. About 16 percent of the riparian/wetland communities that occur on the forest are found within the Upper Colorado River basin.

Stream density is 3.9 miles per square mile. There are 72 7th-level watersheds, or catchments within this unit. Two watersheds within this unit provide a source of water to Glenwood Springs.

Five physiographic units are found within the Upper Colorado River unit. Volcanic plateau lands generally occur within the upper portions of Derby Creek basin. These lands are typically stable except at the margins of basalt flows, which are prone to landslides. Soils in these lands typically have a slight-to-moderate erosion hazard.

In the grasslands and forblands, soil fertility and the degree of limitation for revegetation are moderate. In the coniferous forest lands, soils are rated low for inherent fertility and severe for their degree of limitation for revegetation. The high-relief, mixed-sedimentary mountainous lands occur within the portion managed by the Sopris Ranger District as well as within the upper elevations of lands managed by the Holy Cross Ranger District. Much of the Deep and Sweetwater Creek basins are also made up of these physiographic land units. The erosion hazard of soils in these areas is generally moderate to severe, with mud and debris flows common in areas with steep, barren slopes. Sweetwater Creek saw a significant mudflow in the 1970s. Soil fertility ranges from low to high and the limitation for revegetation ranges from slight to severe.

The Derby and Sunnyside Creek basins fall within the low-relief, mixed-sedimentary mountainous lands. The variety of soils here is due to sedimentary formations as well as glacial and landslide deposits. Ratings for erosion hazard, soil fertility and revegetation limitation vary widely as well.

The lower portion of land in the Upper Colorado River basin managed by the Holy Cross Ranger District is low-relief, soft-sedimentary mountainous and volcanic mesa lands. Soils in this physiographic area generally have low fertility with a severe limitation for revegetation. Their erosion hazard potential is severe, and mud and debris flows can be common occurrences.

Finally, hard-sedimentary plateau and canyon lands can be found within the portions managed by the Rifle Ranger District, generally No Name and Grizzly creeks. These lands contain relatively flat terrain that is deeply incised by tributaries to the Colorado River. The terrain is fairly stable except in steep canyons, which are subject to rockfall. Soils in the plateau lands have a slight erosion hazard with a high inherent fertility and a slight degree of limitation for revegetation. Soils in the canyon lands are rated severe for erosion hazard. Fertility is high with a moderate degree of limitation for revegetation.

Lower Colorado River Unit. The Lower Colorado River unit represents lands managed by the White River National Forest that occur within the Lower Colorado River basin from Glenwood Springs downstream. Lands within this unit fall entirely within the Rifle Ranger District. Within the unit are 162 miles of perennial streams, 1,450 miles of intermittent streams, 300 acres of lakes and ponds, and 3,470 acres of wetlands and riparian areas. Seven percent of the riparian/wetland communities that occur on the forest are found within the Lower Colorado River basin.

Stream density is 3.9 miles per square mile. There are 71 7th-level watersheds, or catchments, within this unit. Three watersheds within this unit provide water to three municipalities.

Two physiographic units are found within lands managed by the forest in the Lower Colorado River unit. The hard-sedimentary plateau and canyon lands occur within the northeastern portion of the Rifle Ranger District, which includes Elk, South Canyon, and Mitchell creeks. These lands contain relatively flat terrain that is deeply incised by tributaries to the Colorado River. The terrain is fairly stable except in the steep canyons, which are subject to rockfall. Soils in the plateau lands have a slight erosion hazard with a high inherent fertility and a slight degree of limitation for revegetation. Soils in canyon lands are rated severe for erosion hazard. Fertility is high, with a moderate degree of limitation for revegetation.

The rest of the district contains high-relief, mixed-sedimentary mountainous lands. The erosion hazard of soils in these areas is generally moderate to severe, with mud and debris flows common in areas with steep, barren slopes. Soil fertility ranges from low to high, and the limitation for revegetation ranges from slight to severe.

Upper White River Unit. The Upper White River unit represents lands managed by the White River National Forest that occur within the Upper White River Basin as well as a few 7th-level watersheds (catchments) that drain into the Upper and Lower Yampa River and Piceance Basin. Lands within this unit fall entirely within the Blanco Ranger District. Within the unit are 330 miles of perennial streams, 1,810 miles of intermittent streams, 2,300 acres of lakes and ponds, and 9,370 acres of wetlands and riparian areas. About 18 percent of the riparian/wetland communities that occur on the forest are found within the Upper White River basin.

Stream density is 3.8 miles per square mile. There are 46 7th-level watersheds (catchments) within this unit. The White River provides a water supply to Meeker.

Two physiographic units are found within the lands managed by the White River National Forest in the Upper White River unit. High-relief, mixed-sedimentary mountainous lands occur generally in the lower elevation lands that drain into the White River as well as those that are within the Piceance basin. The erosion hazard of soils in these areas is generally moderate to severe, with mud and debris flows common in areas with steep, barren slopes. Soil fertility ranges from low to high and the limitation for revegetation ranges from slight to severe.

The higher-elevation lands within the Upper White River basin are volcanic plateau lands. These lands are generally stable except at the margins of basalt flows, which are prone to landslides. Soils in these lands typically have a slight-to-moderate erosion hazard. In the grasslands and forblands, soil fertility and the degree of limitation for revegetation are moderate. In the coniferous forest lands, soils are rated low for inherent fertility and severe for their degree of limitation for revegetation.

Resource Protection Measures

Watersheds and their streams can sustain some resource use and disturbance without serious consequences. Some watersheds, because of their geology, are more resistant to disturbance than others. Consequently, resource development and use in each watershed must be carried out in such a way that watershed and stream health are not compromised. Management on the White River National Forest will provide protection of aquatic, riparian, and wetland resources by implementing the following measures:

- Follow the watershed conservation practices (Forest Service Handbook, Region 2 supplement 2509.25), which provide standards for all management activities to protect soil, aquatic resources, and riparian areas. Each standard has one or more design criteria that describes in more detail how an activity will be conducted to protect soil productivity, stream channels, and water quality. The watershed conservation practices will limit impacts on stream health and help maintain the chemical, physical, and biological integrity of White River National Forest waters. Their use complies with non-point source pollution control regulations and the National Forest Management Act (NFMA).
- In watersheds in which the human- or naturally caused risks are high, watershed improvement or extraordinary mitigation measures may be used to offset the impacts of the proposed project. Appendix J of the forest plan (USDA Forest Service/WRNF 2002b) contains additional information regarding watershed risk ratings.

Environmental Consequences

This analysis focuses on maintenance level 1 and 2 roads as well as motorized trails, where most of the road mile differences occur among the alternatives. Alternative A includes miles of user-created routes. Comparisons among the three alternatives assume that travelways identified for decommissioning or rehabilitation are effectively closed.

Because they typically disturb more area per length than do trails, roads are a considered a major cause of erosion. Unpaved, they are vulnerable to rainfall and runoff eroding their surface. Paved or unpaved, they serve to concentrate and accelerate runoff, which can erode unarmored surfaces such as road fills and hillslopes. Without any means of detention such as vegetation or sediment basins, roads can efficiently convey sediments directly into a stream system.

Motorized travel allows greater distances to be covered over time, leading to larger areas of ground disturbance than seen by slower means of travel such as hiking, biking or horseback riding. In addition, the road prism of cut, fill, and travel surface typically disturb and occupy a wider area than trails primarily used for non-motorized travel. Table 3.24 compares the total miles of maintenance level 1 and 2 roads and of motorized trails for each action alternative.

Table 3.24—Miles of maintenance level 1 and 2 roads and motorized trails

	Alternative A	Alternative F	Alternative G
Miles of level 1 and 2 roads	1,946	1,676	1,392
Miles of motorized trails	156	164	211
Total miles	2,102	1,840	1,603

General Effects

Forest roads are generally associated with timber harvests, dispersed recreation, mining, private land access, and ski areas. They can impact the physical and biological resources necessary to sustain aquatic life (Copstead 1997). These impacts can occur in several ways:

- Disruption of a watershed's natural hydrology. Roads serve to capture surface and subsurface runoff on hillslopes, thereby interrupting natural flow paths to receiving stream channel systems. Unmitigated, the captured runoff can be delivered to stream systems more rapidly and at a higher rate of flow and can

impact the timing and magnitude of natural stream flows. Stream channels will respond to significant increases in flow rates by widening or deepening in order to carry these greater flowrates.

- Increased deposits of sediment into a stream system. Unpaved roads present a risk of eroding during rainfall and snowmelt runoff periods. Unchecked, roads can directly convey eroded sediments into a stream system. Roads constructed on unstable slopes can add to structural instability of these areas, leading to landslides and greater sources of sediments.
- Reduction of riparian, wetland and aquatic habitat. Roads constructed adjacent to a stream system can impede functional riparian habitat. Surface and subsurface water that supports wetlands and riparian areas can also be disrupted by a road and may reduce the size and function of these resources. Sedimentation and stream channel responses to increased flow rates can adversely impact aquatic habitat.

Road impacts can persist long after a travelway is closed unless measures are taken to disconnect runoff pathways into a stream channel and/or onto a road surface. Proper design and location of travelways can significantly reduce the risk of flood flows, slope failures, sedimentation, and stream channel degradation. This includes avoidance of steep slopes, high-erosion hazard areas, stream channels, riparian and wetland areas, and areas of high mass movement potential. When roads are properly planned, constructed, and maintained, their long-term impacts on watershed resources, whether or not they are open or closed to travel, are effectively reduced.

Watershed conservation practices and forest plan standards and guidelines prescribe extensive measures to protect soil, riparian, wetland, and aquatic resources. Generally, adverse impacts on these resources can be minimized when all applicable measures are applied and effective. There is a point of diminishing returns, however, where the risk rises that these protective measures will fail to be fully effective. Hence, alternatives that propose greater densities of roads may increase the risk of adverse impacts on aquatic and riparian resources.

Direct and Indirect Effects

Density. An evaluation of road and motorized trail density indicates the potential for erosion, adverse water quality impacts, and modified hydrology. Roads and the wider trails used by motorized vehicles can intercept, concentrate, and divert water. Their impacts can be mitigated, but not completely eliminated, if they are to serve as travel routes. This analysis of road and motorized trail density is based on the general assumption that areas with greater road and motorized trail density generally have a greater risk of adverse impacts.

A watershed risk assessment was conducted for linear density in each 6th-level subwatershed. A high risk rating indicated the greatest potential for adverse road impacts. Conversely, a low risk rating indicated less potential for adverse impacts. Risk ratings were defined as follows:

- **High risk:** Watersheds with 3.0 or more miles per square mile;
- **Moderate**: Watersheds with 1.5 to 2.9 miles per square mile; and
- **Low**: Watersheds with 1.4 or fewer miles per square mile.

These risk ratings were applied in this analysis to all maintenance level roads to ascertain overall road density in each watershed. These risk ratings are general; combinations of other factors such as geology and road placement also play a role in determining overall watershed impacts. In addition, road closures do not immediately eliminate hydrologic impacts. Rather, the disturbed surface takes years to stabilize, which depends on the level of success in the closure, vegetative regrowth, and other such factors. Table 3.25 compares the number of watersheds under each risk rating for each geographic unit. Alternative A includes user created roads not authorized by the forest. Alternatives F and G assume these user created roads are either closed or incorporated into the authorized road and trail system.

Table 3.25—Number of watersheds under each road density risk rating

Watershed	Square miles on NFS lands	Alternative A			Alternative F			Alternative G		
		H*	M	L	H	M	L	H	M	L
		----------Number of watersheds----------								
Colorado River Headwaters	453	0	20	30	0	12	38	0	5	45
Blue River	487	5	19	36	0	7	53	0	8	52
Eagle River	611	4	24	41	0	13	56	0	5	64
Roaring Fork River	1,018	1	15	84	0	2	98	0	2	98
Colorado Plateau	251	0	2	34	0	0	36	0	0	36
White/Yampa Rivers**	593	1	8	31	1	6	33	0	6	34
Totals	**3,413**	**11**	**88**	**256**	**1**	**40**	**314**	**0**	**26**	**329**

** H-high, M-moderate, L-low road density risk rating*

*** This watershed is a composite of four 4th Level HUCs: Upper White River, Upper Yampa, Lower Yampa and Piceance/Yellow Creeks*

For the Blue River, Eagle River, Roaring Fork River and White/Yampa River geographic areas, high road densities would be greatest under the no action alternative. For the Colorado River Headwaters and Colorado River Plateau geographic areas, there would be no change in the number of watersheds that fall in the high-density rating under any of the action alternatives.

Moderate risk road densities in all of the analyzed geographic areas would be greatest under Alternative A. The lowest moderate risk road density would occur in the Blue River under Alternative F and in the Colorado River Headwaters and Eagle River under Alternative G. There would be no change between Alternatives F and G for moderate road density risk in the Roaring Fork River, Colorado River Plateau and White/Yampa River geographic areas.

Table 3.26 identifies selected watersheds of high and moderate risk road densities under each of the three alternatives. High risk road densities are identified as shaded cells. Overall, ML 1 and 2 roads occupy more than 90 percent of the road miles in these watersheds.

Table 3.26—High and moderate risk road densities for selected watersheds, in miles per square mile (high risk densities are shaded in gray)

HUC* #	Watershed name	Alternative A	Alternative F	Alternative G
		----------Miles per square mile----------		
	Colorado River Headwaters			
14010001280102	Upper Cottonwood Creek	2.89	1.45	1.59
14010001181316	Freeman Creek	2.60	1.54	2.17
14010001250100	Lower Sweetwater Creek Composite	2.48	1.13	0.48
14010001160304	Slate Creek	2.36	1.83	1.73
14010001180102	Castle Creek	2.33	2.05	0.93
14010001180609	Rock Creek	2.12	0.94	1.66
14010001250407	Cross Creek	2.05	1.44	0.57
14010001250405	Lake Creek	1.78	1.41	0.34
	Blue River			
14010002021921	Salt Lick Gulch	5.77	0.82	1.24
14010002030101	Dillon Reservoir Composite	4.18	2.28	2.64
14010002040102	Frey Gulch	3.47	2.93	2.84
14010002010500	Deep Creek	3.14	2.24	2.11
14010002050200	Swan River	3.11	1.48	1.51
	Eagle River			
14010003050910	June Creek	3.60	2.56	1.51
14010003080912	Eagle Rvr abv Pando Composite	3.52	1.58	1.24
14010003050607	Berry Creek	3.44	2.35	1.16
14010003050606	Eagle Rvr abv Edwards Comp.	3.19	2.84	1.29
14010003020103	Old Man's Gulch	2.76	1.12	1.14
	Roaring Fork River			
14010004040104	Red Canyon	3.58	1.33	1.84
14010004030128	Rocky Fork Creek	2.92	0.99	0.75
14010004020104	Blue Creek	2.43	0.87	1.28
	Colorado Plateau			
14010005020304	Hadley Gulch	1.73	1.26	1.17
14010005010700	East Rifle Creek	1.64	1.06	1.12
	White River			
14050005030501	Coal Creek	3.15	3.01	2.12

** HUC = hydrologic unit code.*

Proximity to Stream Channel

Ideally, roads should be located as far away from streams as possible to avoid direct deposits of sediment into the drainage channel. Roads constructed near a stream pose a greater risk to water quality and to modifying hydrologic response of streamflow from runoff events. When located close to a stream channel, there is less available buffering to capture or hinder the transport of eroded material and other pollutant runoff to the stream. Because roads intercept and concentrate water, the closer they are to a drainage channel, the quicker a stream will respond to a runoff event. This can result in higher peak flows.

Significant impacts can result in greater channel erosion than natural conditions. Table 3.27 shows the miles of motorized trails and ML 1 and 2 roads within 300 feet of a stream channel.

Table 3.27—Miles of roads within 300 feet of a stream channel, by analysis areas

Analysis area	No Action			Alternative F			Alternative G		
	Roads	*Motor Trails*	*Sum*	*Roads*	*Motor Trails*	*Sum*	*Roads*	*Motor Trails*	*Sum*
Colorado Headwaters	91	9	100	83	9	92	59	1	60
Blue River	101	3	104	74	3	77	74	14	88
Eagle River	121	5	126	101	5	106	73	0	73
Roaring Fork River	104	5	109	86	6	91	70	16	86
Lower Colorado River	99	0	99	80	1	81	77	3	80
White River	126	57	183	120	59	179	101	54	155
Totals	**642**	**79**	**721**	**544**	**82**	**626**	**454**	**88**	**542**

Mileage for roads reflects maintenance level 1 and 2 roads only.

Overall, Alternative A would have the most road miles occurring within close proximity to a stream channel; Alternative G would have the fewest. Although table 3.30 provides general comparisons of alternatives for each geographic area, the actual impacts from road proximity to streams will be more apparent at a larger scale analysis such as for 7th-level watersheds (subwatersheds).

For riparian and wetland protection the same analysis above reflects the alternative that would have the least impact, as wetland and riparian areas generally occur close to streams. Alternative G would be most favorable, followed by alternative F, and lastly alternative A. Alternative A does nothing to repair or remove roads and trails near wetlands or streams, whether a part of the travel system or not. Alternative F takes measures to rehabilitate non-system routes which can aid in having less impact on wetland and riparian areas. Alternative G takes into account not only removing both system and non-system routes that are not needed or that are causing resource impacts, but also in some cases removes routes near streams in favor of duplicate routes further away from streams.

Stream Crossings

The number of stream crossings, by analysis area and alternative, is presented in table 3.28. Tabulating the number of stream crossings by roads provides an estimate of the potential for disruption of streamflow rates and sediment input.

Table 3.28—Number of stream crossings by management level 1 and 2 roads and motorized trails

Analysis area	No Action			Alternative F			Alternative G		
	Roads	*Motor Trails*	*Sum*	*Roads*	*Motor Trails*	*Sum*	*Roads*	*Motor Trails*	*Sum*
Colorado Headwaters	337	37	374	303	37	340	211	2	213
Blue River	338	15	353	235	15	250	246	53	299
Eagle River	416	27	443	341	27	368	263	0	263
Roaring Fork River	348	14	362	289	15	304	229	69	298
Lower Colorado River	338	0	338	267	1	268	274	10	284
White River	454	244	698	429	254	683	364	234	598
Totals	**2231**	**337**	**2568**	**1864**	**349**	**2213**	**1587**	**368**	**1955**

Alternative A would result in the greatest number of stream crossings; overall, Alternative G would result in the fewest. For most watersheds there would not be much difference in the number of stream crossings among alternatives. Stream health would be enhanced in those watersheds where Alternative F or G would result in less stream crossings by a road.

Cumulative Effects

Along with roads and trails, nearly all of the management activities (i.e. recreation, logging, mining, grazing, and water diversions) that are conducted on the White River National Forest have the potential to affect water resources including riparian areas, wetlands and streams. These resources can also be impacted by land use activities on lands outside of Forest Service administration and within watersheds of shared jurisdiction with the forest. The cumulative impact of these activities depends upon the effects of past and present management as well as the watershed's inherent ability to absorb additional disturbance to its biological and physical elements.

Cumulative effects to aquatic and riparian resources from forest management activities can be addressed by applying applicable watershed conservation practices and monitoring their effectiveness. When appropriate, partnerships that emphasize watershed health can be pursued in watersheds of multiple ownerships.

Wilderness

Introduction

The White River National Forest fully manages three wilderness areas and shares management of five wilderness areas with adjoining national forests. Current management emphasis allows natural processes to be maintained or improved within wilderness and is outlined in the forest plan. All motorized and mechanized vehicular use is prohibited in a national forest wilderness (USDA Forest Service 2004a, 36 CFR 261.16).

Management Direction

The overall direction for managing recreation resources on the White River National Forest includes the national strategic goals to provide outdoor recreation opportunities in natural forest settings, promote access to recreation opportunities, and provide primitive types of experience in wilderness settings (USDA Forest Service/WRNF 2002a). One of the forest-wide goals and objectives for wilderness is to improve the capability of wilderness and protected areas to sustain a desired range of benefits and values. Wilderness should be managed so that changes in the ecosystem are primarily a consequence of natural forces or within the range of natural variability and succession (USDA Forest Service/WRNF 2002a).

Applicable guidelines for management area 1.11 and the pristine recreation opportunity spectrum (ROS) category direct that trails should not be constructed or reconstructed and that when resource damage exists from concentrated use of cross-country travelways, measures be taken to correct problems. Guidelines for management area 1.12 and primitive ROS say to take the following actions when needed: (a) minimize trail impacts on scenic resources and (b) eliminate duplicate trails. Finally, in management area 1.13 and semi-primitive ROS, recreational livestock is prohibited or restricted except for through-travel use.

Desired Condition

The desired condition for recreation requires balancing the needs to provide diverse recreation opportunities, facilitate user access, and protect wilderness resource values. The desired condition for wilderness management is described below for each management area on the forest.

1.11 Pristine Wilderness: These areas provide the most outstanding opportunities for solitude and isolation. User-created trails or game trails may exist but are not maintained or designated on maps or trail guides. Recreation opportunities in this pristine ROS offer primitive and unconfined experiences.

1.12 Primitive Wilderness: Recreation is managed to protect natural conditions, provide opportunities for primitive recreation, offer a moderately high degree of solitude, and incorporate a ROS of semi-primitive non-motorized or primitive year-round. Travel is along primitive trails or unconfined.

1.13 Semi-Primitive Wilderness: These areas are managed to protect natural conditions and to provide access to primitive or pristine areas. Encounters with other users may be frequent because of concentrated use in the area. Trail and bridge construction incorporate natural designs and native materials that complement the

surrounding landscape whenever possible. Travel is primarily along a well-defined trail system.

Key Indicators

Key indicator: Impacts on solitude and remoteness in designated wilderness.

Measure: Miles of system trail open to foot and horse use.

Measure: Miles of system trail open to foot use only.

Measure: Miles of unauthorized (non-system) trails to be decommissioned.

Measure: Miles of unauthorized (non-system) trails added to the system.

Affected Environment

Approximately one-third of the forest, totaling 755,100 acres, is designated wilderness, the largest proportion of any national forest in Colorado. This represents 24 percent of the state's designated wilderness on National Forest System lands.

Figure 3.15 displays the location of existing wilderness areas on the White River National Forest. Basic establishment and acreage data are summarized in table 3.29. Further background information on wilderness is incorporated by reference to the forest plan (USDA Forest Service/WRNF 2002b).

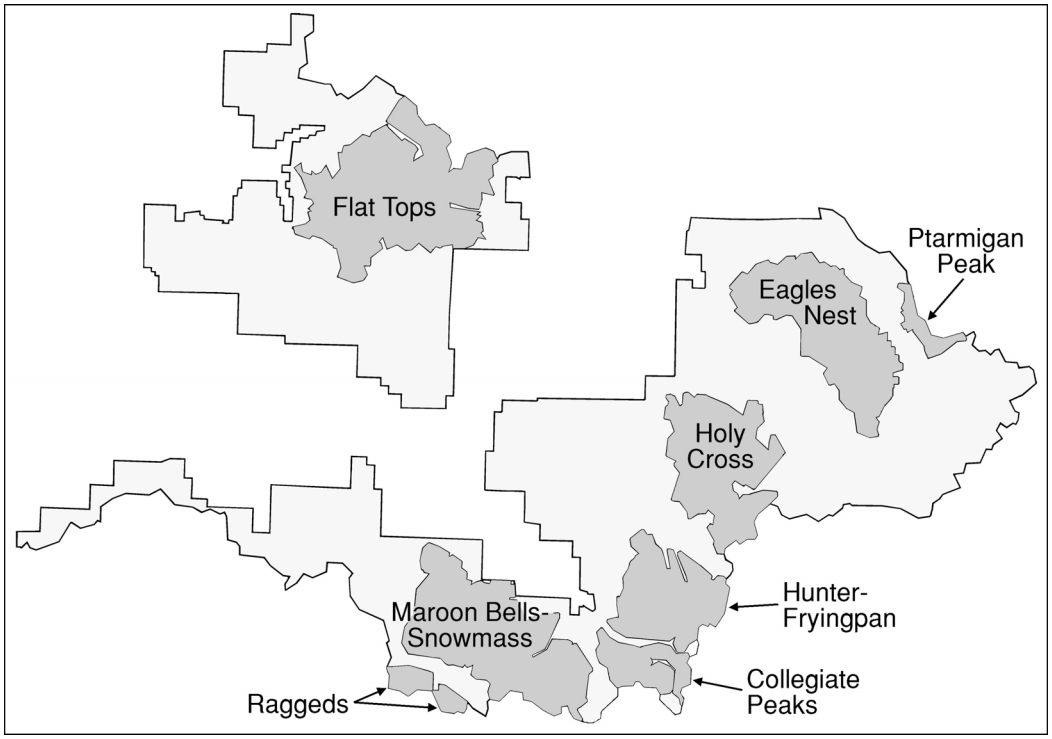


Figure 3.15—Existing wilderness areas on the White River National Forest

Table 3.29—Acres of existing wilderness on the White River National Forest

Name	Establishing law	White River National Forest	Other acreage*	Total
		----------Acres----------		
Collegiate Peaks	P.L. 96-560 12-22-80	35,482	189	35,671
Eagles Nest	P.L. 94-352 07-12-76	133,311	185	133,496
Flat Tops	P.L. 94-146 12-12-75	196,344	192	196,536
Holy Cross	P.L. 96-560 12-22-80	113,366	475	113,841
Hunter-Fryingpan	P.L. 95-237 02-24-78 P.L. 103-77 08-13-93	82,026	40	82,066
Ptarmigan Peak	P.L. 103-77 08-13-93	13,175	0	13,175
Raggeds	P.L. 96-560 12-22-80	16,793	39	16,832
Maroon Bells /Snowmass	P.L. 88-577 09-03-64 P.L. 96-560 12-22-80	161,984	1,499	163,483
Totals		**752,481**	**2,619**	**755,100**

**The "other acreage" category includes lands under private or other type of ownership. It does not include National Forest System acreage on adjoining national forests. Source: USDA Forest Service 2003.*

Recreation Activities

The Wilderness Act of 1964 limits the type of recreation activities that may occur in designated wilderness to non-motorized and non-mechanized methods of travel. Table 3.30 displays the current mileage of wilderness trails. During the snow-free season, most system and non-system trails are open to foot and horse travel. National Forest System trails are those that are maintained as system trails. Unauthorized (non-system) trails usually are not-constructed routes that are currently used by recreationists but are not maintained by the Forest Service. Many of these routes are game trails or user-created trails.

During the winter, the area-wide strategy for wilderness allows non-motorized and non-mechanized travel predominately in the modes of cross-country skiing and snowshoeing. Year-round, off-trail travel is allowed for horse and foot traffic but not encouraged because of the potential resource impacts with repeated use.

Table 3.30—Miles of trail in each wilderness area on the White River National Forest

Wilderness area	NFS trails Foot/horse	Non-system Unauthorized	Total
	----------Miles----------		
Collegiate Peaks	12.6	4.4	17.0
Eagles Nest	155.2	17.7	172.9
Flat Tops	270.9	26.6	297.5
Holy Cross	114.8	19.1	133.9
Hunter-Fryingpan	67.3	29.3	96.6
Maroon Bells-Snowmass	152.2	21.8	174.0
Ptarmigan Peak	14.2	0.0	14.2
Raggeds	10.9	0.0	10.9
Totals	**798.1**	**118.9**	**917.0**

Mileage calculations are based on GIS analysis.

Recreation Use and Capacity

Nation-wide the most popular recreation activities include walking, sightseeing, and picnicking (USDA Forest Service 2000a). The White River National Forest NVUM results (Kocis et al. 2003) estimate that there are 291,640 wilderness visits (error rate 15 percent), with most users being from Colorado and average length of stay 7.9 hours. Visitor use of wilderness areas on national forests is forecasted to grow between 0.5 percent and 1 percent per year for the next 50 years (Cordell 1999). Locally, there is an increased demand for pristine, primitive, and semi-primitive non-motorized recreation opportunities as private land is developed; the growth rate of local counties is as high as 4 percent annually, and Colorado's overall growth has increased 30.6 percent since 1990 (U.S. Department of Commerce 2004).

Theoretical capacity for recreational opportunities for wilderness and non-wilderness travel are displayed on a trail (snow-free) and area-wide (snow-covered) basis (see the capacity discussion in the recreation section of this chapter). The forest plan and travel management plan helps to establish the framework for determining recreation capacity within designated wilderness. Additional analysis will be required to determine site-specific limiting factors and establish practical capacities for these areas.

Travel Management Conflicts

Within wilderness, travel management conflicts exist. Some hikers dislike encountering horses or even the evidence of horse use in wilderness areas (Cordell 1999). Popular peaks, such as those above 14,000 feet within wilderness, receive use levels inconsistent with primitive and semi-primitive recreation opportunity guidelines. Frequently, when private land is developed near wilderness, recreationists expect nearby access to the national forest and will pioneer routes when those are not provided.

Environmental Consequences

General Effects

Short-term impacts on wilderness resources on the forest are not anticipated, because only legal uses will be considered for travel management strategies. Long-term impacts on the wilderness resource are expected only if the selected alternative adds significant additional mileage of non-system miles to the system, restricts the type of activity allowed, or decommissions part of the system, thereby changing the amount of activity allowed. Table 3.31 summarizes the number of miles of system trail open by activity; table 3.32 summarizes miles of non-system ways decommissioned and miles of non-system ways added to the system.

Table 3.31—Miles of system trails in wilderness areas, by alternative

Wilderness	Miles of system trail open					
	Foot/horse			Foot only		
	Alternative A	Alternative F	Alternative G	Alternative A	Alternative F	Alternative G
Collegiate Peaks	12.5	12.5	12.5	0	0	0
Eagles Nest	158.0	158.1	141.4	0	0	13.1
Flat Tops	269.6	269.6	261.0	0	0	0
Holy Cross	114.5	114.5	107.5	0	0	4.9
Hunter-Fryingpan	67.0	67.0	59.8	0	0	0
Ptarmigan Peak	14.1	14.1	14.1	0	0	0
Raggeds	10.9	10.9	10.9	0	0	0
Maroon Bells/Snowmass	152.4	152.4	150.9	0	0	0
Totals	**799.0**	**799.1**	**758.2**	**0**	**0**	**18.0**

Table 3.32—Miles of unauthorized (non-system) trails decommissioned or added to the system by alternative and wilderness area

Wilderness	Miles of unauthorized (non-system) trails					
	Decommissioned			Added to the system		
	Alternative A	Alternative F	Alternative G	Alternative A	Alternative F	Alternative G
Collegiate Peaks	0	4.4	4.4	0	0	0
Eagles Nest	0	17.0	6.6	0	0	10.4
Flat Tops	0	25.5	23.8	0	0	1.7
Holy Cross	0	19.4	17.3	0	0	2.1
Hunter-Fryingpan	0	29.3	29.3	0	0	0
Ptarmigan Peak	0	0	0	0	0	0
Raggeds	0	0	0	0	0	0
Maroon Bells/Snowmass	0	19.3	17.1	0	0	2.0
Totals	**0**	**114.6**	**98.4**	**0**	**0**	16.2

Direct and Indirect Effects

Recreation opportunities. No alternative proposed would add net trail miles to the system inside wilderness. Alternative F would have the greatest drop in miles followed by Alternative G, and Alternative A, the no action alternative, retains current condition. Alternative G is the only alternative that does adopt user created routes.

Prohibitions for stock. Currently, very few trails are closed to stock users. Alternative G would have mileage of trail open to hikers and not to horses. This would only affect the Eagles Nest and Holy Cross wilderness areas, at 13.1 miles and 4.9 miles, respectively. Of the entire forest trail system, this accounts for only 2 percent of the total open wilderness trail miles and far less than 1 percent of the total forest trail miles. Area-wide stock use would continue to be permitted and remains unchanged in all alternatives.

Management of unauthorized trails (non-system trails). Alternative F would decommission the most miles of non-system trails (114.6 miles), followed by Alternative G (98.4 miles). As the non-system routes are returned to their natural state, the opportunities for pristine and primitive recreation opportunities would increase, and opportunities for semi-primitive recreation opportunities would decrease.

Overall, additions to system trails would increase recreational opportunities and the capacity for recreation use. Future planning efforts, specifically the forest-wide recreation capacity analysis, will be used to address site-specific conflicts between trail recreation use numbers and wilderness management direction.

Winter recreation. The area-wide strategy for winter travel within designated wilderness will continue to allow non-motorized and non-mechanized travel both on system trails and cross-country. Designated routes may be required in areas with critical winter range habitat. No significant change in use patterns or activities from the current condition is anticipated.

Cumulative Effects

Since the Wilderness Act constrains the type of recreation activity within designated wilderness to non-motorized and non-mechanized, there are very few cumulative changes that would occur in the types of recreation activities allowed. As private land continues to develop near or adjacent to designated wilderness, the demand for access trails and eventual overall mileage of trails will continue to increase. There is currently an effort underway to add to the overall designated wilderness acreage on the forest. If successful, this proposal may add to the overall trail mileage.

Wildlife

Introduction

The National Forest Management Act (NFMA) requires the forest to maintain habitat for viable populations of all existing vertebrate wildlife species.

The forest plan established several goals, objectives, standards, and guidelines across the forest to maintain or improve habitat for terrestrial and aquatic wildlife species.

The Endangered Species Act of 1973 (as amended) requires all federal departments and agencies to conserve threatened and endangered species and the habitats on which they depend, and to consult with the U.S. Fish and Wildlife Service on all actions authorized, funded, or carried out by the agency to ensure that the action will not likely jeopardize the continued existence of any threatened and endangered species or adversely modify critical habitat (FSM 2670). In addition, the Forest Service requires an evaluation of effects on federal candidate and Forest Service sensitive species and habitat (FSM 2672.4). This evaluation is necessary to ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or animal species or cause any species to move toward federal listing. Determinations of effects on threatened, endangered, and sensitive (TES) species are based on the habitats affected and species occurrence.

In addition to this section and other sections of this EIS, for a complete picture of the terrestrial wildlife, plant, and aquatic species analysis that was completed for this project, see appendix A (Biological Assessment [BA]) for federally listed threatened and endangered species; appendix B (Biological Evaluation [BE]) for sensitive species; appendix C (management indicator species [MIS]); and the forest plan (USDA Forest Service/WRNF 2002a). The details found in those documents will not be repeated here, as they are considered a part of the analysis for decision and are available to the reader.

Assumptions were made concerning the effects of travel management on the species analyzed. These same assumptions are used for the BA, BE, and MIS analyses as well.

- No new road or trail construction is considered in the proposed action.
- The only new ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails.
- Changes will be made to the category of uses among motorized, mechanized, and non-motorized/non-mechanized uses that will result in various levels of impacts on individual species across the forest.
- There will be two types of impacts on species: (1) impacts related to the actual footprint of the road or trail affecting habitat, and (2) disturbance activities resulting from the use of the travelways.
- Each species discussed may have different reactions to motorized, mechanized, or non-motorized/non-mechanized use.
- Decommissioning of identified travelways may take years to fully rehabilitate and resemble surrounding habitats.
- Alternative A, the no action alternative, is considered the current, existing situation on the forest. Alternative A is not compliant with direction in the forest plan. There are a significant number of user-created roads and trails on the forest

that are identified under this alternative. These routes are not a part of the legal White River National Forest transportation system. Motorized or mechanized use of these routes is not legal. There is currently some level of illegal activity from both motorized and mechanized users on some of these routes on the forest, which causes some level of impact on wildlife. The level of illegal use is likely to be more prevalent where prisms remain on the ground. Each of these user-created routes will either be incorporated into the system or decommissioned under Alternatives F or G. The fewer user-created routes left on the landscape, the less likely it is that disturbance to wildlife will occur. The analyses concentrate on what legal uses occur on each system by alternative.

- Alternative F is a minimal action alternative that makes Alternative A compliant with the current forest plan, current laws, and direction. For the majority of the analyses completed for wildlife species, below, the results for Alternatives A and F are very similar or identical. Alternative A differs from Alternative F in that action would be taken to rehabilitate user-created routes in Alternative F. Motorized and mechanized human use currently occurring on user-created routes impacts wildlife in a variety of ways. That use will be unauthorized on those routes scheduled for rehabilitation, and those impacts should be ameliorated as the routes are reclaimed.
- Alternative G is the preferred alternative based on the analysis from the original DEIS, public input, and the application of the national motorized use rule.
- Many of the tables displayed in this document standardize the changes in travelways for comparison purposes. To make comparisons of differing types of habitats and differing sizes of habitats for the various species considered, most analyses use density of miles of travelway per square mile of habitat or the amount of change in travelway density for each alternative, rather than the total number of miles of change within a habitat over the entire forest. For example: the addition of 10 miles of road within a species range of only 20 square miles of habitat would normally be more significant than the addition of 10 miles of road within 1,000 square miles of habitat for another species. Standardization of the analysis displays this as 0.5 new miles of travelway per square mile of habitat in the first scenario, compared to 0.01 miles of travelway per square mile of habitat for the second. It is felt that this comparison is more meaningful than a comparison of total miles of road or trail for each alternative. Similarly, it is felt that more meaningful comparisons among alternatives can be made by using the amount of change based on miles per square mile rather than overall number of miles of change for a relatively large land base across the forest.
- Travel management-related impacts on wildlife vary with the volume, timing, and type of travel; the species of wildlife in the area; the habitats involved; time of day or season of year; and a myriad of other factors. Many of the reports cite effects of roads such as:
    - Habitat fragmentation;
    - Isolation of rare and unique habitats such as bogs or alpine areas;
    - Direct effects such as collisions with animals;
    - Physical destruction of habitats;
    - Abandonment of habitats; and

  - Physiological reactions to stress related to the impacts of travel management.

- No positive benefits to wildlife have been identified from increases in travel management access. Direct and indirect effects on wildlife that have been identified in the literature indicate negative impacts on all studied species as motorized, mechanized and foot and horse uses increase.

Key Indicators

Key indicator: Impacts on wildlife from road and trail activity.

Measure: Road, trail and play area (winter) density by use by habitat type.

Key indicator: Impacts of recreation activity from road and trail use on elk.

Measure: Security habitat.

Key indicator: Impacts on aquatic species from road sedimentation.

Measure: Road density and road proximity to streams and lakes.

Key indicator: Impacts on amphibian species from roads and trails.

Measure: Road and trail proximity to habitat.

Affected Environment

The White River National Forest provides habitat to a wide range of birds, mammals, fish, reptiles, amphibians, and invertebrates, and provides habitats for plants ranging in elevations from 5,500 feet to more than 14,000 feet.

Fish and wildlife habitats are evaluated at various scales. Fisheries are associated primarily with perennial streams, lakes, and reservoirs. The areas of influence for fisheries generally include the watersheds that influence the waters. For this analysis, 6th-level watersheds (subwatersheds) were used. The area of influence for terrestrial wildlife habitat varies with each species evaluated. Some animals may have a limited distribution and home range, while others may be wide-ranging and have extensive distribution. More than 250 species of terrestrial wildlife reside on the White River National Forest, either seasonally or year-long. Seasonal conditions affect the use and location of various species.

Habitat types can be broadly described in ecological categories that occur across the forest. Each provides habitat characteristics special to various species. The ecological categories used for this analysis include: forested, mixed mountain shrub, grass/forb, riparian, aquatic, and alpine regimes. Forested areas are further broken down into conifer forest, aspen, and pinyon-juniper cover types.

Forested

Forested communities provide seasonal and year-round habitat for a wide range of wildlife species found on the White River National Forest. Deer and elk use these areas as summer range. A multitude of avian species can be found in these areas throughout the year, and mammals from shrews to bears also find important habitats within forested communities. Species of special interest within these communities include: Canada lynx, pygmy shrew, boreal and flammulated owls, American marten, northern goshawk, American three-toed woodpecker, and purple martin.

Mixed Mountain Shrub

Mixed mountain shrub communities provide important seasonal habitats for big game that migrate from higher elevation in the summer and fall, to lower-elevation, usually south-facing slopes in the winter and early spring. Elk, mule deer, and bighorn sheep are commonly found using these habitats as winter range areas. A wide range of birds and small mammals also use these habitats year-round. Several species of special interest such as sage grouse, Brewer's sparrow, and Virginia's warbler are tied to these habitats.

These areas often are adjacent to BLM and private lands, and many areas have seen heavy impacts from human development. Mixed mountain shrub habitats provide primary access points to the forest, and many trails and roads dissect these lower elevation areas. These travelways generally follow drainages and ridgelines, which are also highly used by wildlife.

Grass/Forb Meadow

Wildlife species associated with mountain grass/forb meadow habitats include many species of small mammals and birds, including the following species of special interest on the forest: pygmy shrew and elk year-round; and ferruginous hawk, loggerhead shrike, and northern harrier during migration. Both engineered and user-created travelways are commonly found in these habitats because there is no need to clear vegetation to establish a travel route.

Riparian Areas and Wetlands

Although a very limited amount of the White River National Forest is classified as riparian (less than 3 percent), riparian areas receive a disproportionate share of wildlife use. Many terrestrial and aquatic wildlife species found on the forest—including amphibians, waterfowl, and shorebirds—use riparian habitats as their primary habitat association. Roads and trails often exist in areas that also provide some of the most important wildlife habitats. Wetlands are found in association with streams, lakes, ponds, reservoirs, springs, bogs, and marshes. These wetlands range from areas that are permanently submerged with emergent vegetation to areas that are only seasonally saturated at the surface following snowmelt and vegetated by sedges, rushes, and willows. Traditionally, many of the existing travelways are adjacent to riparian and stream corridors.

Aquatic

Aquatic ecosystems include the stream channel, lake or estuary bed, water, biotic communities, and the habitat features that occur therein. Cold-water fish habitat on the forest is characterized by clear, cold water; a silt-free rocky substrate in riffle-run areas; areas of slow, deep water; well-vegetated, stable streambanks; and lacustrine (lake) habitat, which is characterized by clear, cold, deep lakes and reservoirs. Warmer-water fish species of interest occur in streams and rivers at lower elevations on the forest and downstream of the forest.

Alpine

Alpine areas have an abundance of wildlife use during the short summer season but only a few hardy species such as the white-tailed ptarmigan use alpine habitats year-round. Species of special interest in the alpine communities include: elk, wolverine, and white-tailed ptarmigan. Alpine areas also offer potential habitat for the federally listed

threatened Uncompahgre fritillary butterfly. Table 3.33 lists the species evaluated and their associated habitat types.

Table 3.33—Species evaluated and their associated habitat types

Species	Habitat Classification					
	Mixed mountain shrub	Forest	Grass/ forb	Riparian and aquatic	Alpine	Location of evaluation in this EIS
Mammals						
Townsend's big-eared bat	P	P	P	P		BE
Spotted bat	P	P	P			BE
Wolverine	P	P	P	P	P	BE
River otter				P		BE
American marten		P		P	S	BE
Fringed myotis	P	P				BE
Pygmy shrew		P	P	P		BE
North American (Canada) lynx	P	P	P	S	S	BA
Cave bats	P	P	P	P		MIS
Elk	P	P	P		S	MIS
Bighorn sheep		P	P		P	BE
Birds						
Northern goshawk	S	P	S	P		BE
Boreal owl		P				BE
Sage sparrow	P					BE
Ferruginous hawk			P			BE
Greater sage grouse	P					BE
Northern harrier	S		P	S		BE
Olive-sided flycatcher		P				BE
Black swift				P		BE
American peregrine falcon	S	P	P	P	S	BE
White-tailed ptarmigan				S	P	BE
Loggerhead shrike	P		P			BE
Lewis' woodpecker				P		BE
Flammulated owl		P				BE
American 3-toed woodpecker		P				BE
Purple martin	S	P	S			BE
Brewer's sparrow	P					BE, MIS
Columbian sharp-tailed grouse	P		S	S		BE
Mexican Spotted owl		P				BA
Bald eagle				P		BE
American pipit					P	MIS
Virginia's warbler	P					MIS
Amphibians						
Boreal toad				P		BE
Northern leopard frog				P		BE

Species	Habitat Classification					
	Mixed mountain shrub	Forest	Grass/ forb	Riparian and aquatic	Alpine	Location of evaluation in this EIS
Fish						
Colorado River cutthroat trout				P		BE
Roundtail chub				P		BE
Bluehead sucker				P		BE
Flannelmouth sucker				P		BE
Mountain sucker				P		BE
Colorado pikeminnow				P		BA
Humpback chub				P		BA
Razorback sucker				P		BA
Bonytail				P		BA
Greenback Cutthroat trout				P		BA
All Trout				P		MIS
Invertebrates						
Great Basin silverspot				P		BE
Uncompahgre fritillary butterfly					P	BA
Aquatic macroinvertebrates				P		MIS
Plants						
Carex diandra				P		BE
Cypripedium parviflorum		P				BE
Eriophorum altaicum				P		BE
Eriophorum chamissonis				P		BE
Eriophorum gracile				P		BE
Ptilagrostis porteri					P	BE
Armeria maritima					P	BE
Astragalus leptaleus					P	BE
Astragalus wetherillii	P					BE
Braya glabella					P	BE
Cirsium perplexans	P					BE
Draba exunguiculata					P	BE
Draba grayana					P	BE
Ipomopsis globularis					P	BE
Machaeranthera coloradoensis			P		P	BE
Parnassia kotzebuei				P		BE
Penstemon harringtonii	P					BE
Phacelia scopulina	P					BE
Ranunculus karelinii				P		BE
Thalictrum heliophilum	P					BE
Eutrema penlandii					P	BA

P= Primary habitat, S= Secondary habitat; BA=appendix A, BE=appendix B, MIS=appendix C

Environmental Consequences

General, Direct, and Indirect Effects: Terrestrial and Aquatic

The White River National Forest and adjacent BLM lands contain large tracts of relatively unroaded, unfragmented land that provide essential habitat to fish and wildlife. Most of these areas are associated within existing wilderness, recommended wilderness, research natural areas, backcountry non-motorized areas, and other management areas where motorized travel is restricted or prohibited. Collectively these tracts of land provide large tracts of undisturbed land important for a wide range of wildlife to provide security from motorized human activities. Natural disturbance (such as fire and avalanche), and human-caused use (such as mining, timber harvest, or private land development) contribute to the degree of habitat patchiness of the landscape. On a landscape scale, habitat security areas and wilderness contribute to regional biodiversity. Regional biodiversity refers to the pattern of habitats and species across a land area of thousands to millions of acres. This level of biodiversity has important functional ramifications. For instance, many wide-ranging animals require a variety of habitat types occurring across a large geographic area.

Several recreational based communities are located within close proximity of the forest and are sources of intense recreational activities. The towns of Aspen, Glenwood Springs, Snowmass Village, Vail, and Avon, and communities in Summit County, are associated with local ski areas and other year-round tourist activities such as mountain biking, climbing, hiking, four-wheel driving, backpacking, and pack trips. The activities centered in these towns result in high levels of human activity on the surrounding National Forest System lands. Other high-use activities across the forest include snowmobiling, all-terrain vehicle riding, motorcycling, fishing, driving for pleasure, camping, and hunting. This amount of activity is likely to reduce habitat effectiveness, increase stress, and displace animals from preferred habitats. The location of recreational activities has a significant effect on the magnitude of impact.

For big game, the greatest impact occurs where recreational activities occur within seasonal concentration areas and key habitats. The Colorado Division of Wildlife (CDOW) has provided maps of seasonal concentration areas to identify areas of concern. These maps were used during the forest plan revision to map areas of concern for specific wildlife species. Conflicts between current recreational activities and sensitive wildlife habitats have been identified on the forest. These conflicts are associated with periods of consecutive use. The maximum disturbance occurs when human activities coincide with critical wildlife use periods. Animals are stressed and/or displaced from preferred habitats to areas that are less desirable. Displaced animals also seek undisturbed habitats on adjacent private lands that contribute to game damage problems.

Activities that influence water quality have a direct effect on aquatic populations. Water quality and stream physiographic factors that influence these populations are sedimentation, water temperature, in-channel wood, water depth, and change in stream bank or shoreline vegetation. The demand from recreation requiring an increase in roads and trails can lead to additional sedimentation into waterways, straightening and simplification of channels, removal of vegetation, and blockage of passage at crossings if not properly engineered. Mining activity and timber harvesting, including the travel systems associated with these activities, and natural occurrences such as fire and landslides, also lead to changes in water quality.

Travel management-related impacts on wildlife vary with the volume, timing, and type of travel; the species of wildlife in the area; the habitats involved; time of day or season of

year; and a myriad of other factors. Several recent literature reviews of recreational impacts on wildlife have been completed. These include: *Effects of Winter Recreation on Wildlife of the Greater Yellowstone Area: A Literature Review and Assessment* (Olliff et al. 1999); *Effects of Recreation on Rocky Mountain Wildlife Habitat* (Joslin and Youmans 1999); *The Environmental Impacts of Recreation: a Bibliography* (Anon 1999); *Forest Roads: A Synthesis of Scientific Information* (USDA Forest Service 2000c); *Wildlife and Recreationists: Coexistence Through Management and Research* (Knight and Gutzwiller 1995); *Effects of Off-road Recreation on Deer and Elk* (Wisdom et al. in press); and *The Effects of Highways on Elk (Cervis elaphus) Habitat in the Western United States and Proposed Mitigation Approaches* (Ruediger et al. 2006). These exhaustive reviews of past studies contain a wealth of information concerning the impacts on wildlife from vehicular and other types of recreation use. Many of the reports cite the effects of roads on habitat fragmentation; isolation of rare and unique habitats such as bogs or alpine areas; direct effects such as collisions with animals and physical destruction of habitats; barriers to movement; abandonment of habitats; and physiological reactions to stress related to the impacts of travel management. The widespread, detrimental impacts of human disturbance on wildlife are well-documented throughout these reports.

General, Direct, and Indirect Effects: Terrestrial Species

Studies of the effect of human disturbance on wildlife have revealed there are critical periods for many species of birds and mammals (Knight and Gutzwiller 1995). The immediate postnatal period in mammals and the breeding period in birds are often the most sensitive. On the White River National Forest, elk calving normally occurs between early May to the end of June. Deer fawning and bighorn sheep lambing also occurs during this general period. The breeding and nesting season for birds generally is from March through June. Species of raptors such as the northern goshawk are extremely sensitive to disturbance during the nesting season, and repeated disturbance may cause abandonment of the nest. Activities within a quarter-mile of an active nest should be avoided from March 1 to July 31 (USDA Forest Service/WRNF 2002a). Seasonal concentration areas of concern for elk on the forest include elk calving areas, summer concentration areas, and elk security areas. The identification of these seasonal ranges and key habitat areas is based on mapping provided by the CDOW and was used to establish several of the management areas allocated during the forest plan revision.

American Elk. Elk was chosen as the primary MIS species for studying the effects of travel for a variety of reasons. It is a species for which a considerable amount of time, effort, and funding has been expended to document the potential impacts from travel management-related issues. Literature reports that elk respond negatively to human access into their range.

Effects From Human Activity

Human activities can disturb wildlife. Some activities may have serious consequences as the result of interactions between recreational disturbances and wildlife, while others have little or no effect. The type and magnitude of impacts on wildlife vary by the type of recreation activity, predictability, frequency and magnitude, timing, and location of disturbance (Knight and Gutzwiller 1995).

Impacts on big game are a significant issue related to travel management. Therefore, much of this analysis is focused on these species. Most available research on the effects of recreational activities on wildlife is related to the impacts of motorized vehicles on elk, and to a lesser extent on deer.

One study in the Pole Mountain area of the Medicine Bow National Forest in south central Wyoming provides some information on elk behavior in relation to other types of recreational activity (Ward and Cupal 1979). On the basis of radio telemetry monitoring it was demonstrated that elk prefer to be at least ½-mile from people engaged in such activities as camping, fishing, and picnicking. The heart rates of two adult cow elk and a spike bull showed definite increases on 21 of 23 occasions when people walked within 0.2 miles of the animals when they were in timber; the animals responded by moving away on 16 of the 21 occasions. Moving automobiles and trail bikes had little effect on elk resting in timber at distances of more than 0.2 miles, but the animals' heart rates increased 24 out of 41 times at closer distances. Elk also showed significant reaction when vehicles stopped within 0.33 mile. Therefore, it appears as though elk tolerate a variety of human activities beyond a threshold distance of ¼- to ½-mile (Ward and Cupal 1979).

The predictability of a given activity shapes wildlife response to it. When animals perceive a disturbance as frequent enough to be "expected" and non-threatening, they show very little overt response. For example, elk are easily conditioned to repeated patterns of human activity within their home range, but are also keenly aware of deviations from normal patterns (Thomas and Toweill 1982). Ward (1973) showed that elk seldom are alarmed at normal disturbance-type activities such as vehicular traffic, camping, fishing, or other recreational activities beyond a threshold distance of ½ mile. Activities within this distance, however, resulted in evasive movement by elk to reestablish and maintain a ½-mile buffer between themselves and the human activity.

The frequency and magnitude of disturbance affect the degree to which wildlife are affected. A number of studies have established the consistent year-round influence of motorized vehicles on elk use of preferred habitats (Thomas and Toweill 1982). Ward (1976), Perry and Overly (1977), Lyon (1979), and others have documented a decline in elk use of areas adjacent to roads. The width of the area avoided by elk has been reported as ranging from 0.25 to 1.8 miles, depending on the amount and kind of traffic, quality of the road, location, and density of the cover adjacent to the road. Elk habitat effectiveness is adversely influenced by the presence of roads and trails that are open to vehicular traffic (Hoover and Wills 1984, Thomas et al. 1979). In general, habitat effectiveness decreases in proportion to the amount of open (motorized) routes per square mile of habitat (Lyon 1983).

On the White River National Forest, the magnitude of disturbance to elk increases dramatically during the big game hunting seasons. The hunting seasons begin with archery season in late August and run consecutively through the end of the fourth rifle season in mid-November. Some areas may be included in late seasons that run into January. Roads and trails that normally receive little or no use are used heavily on a daily basis during the hunting seasons.

Hunted populations of elk, such as those on the White River National Forest, are extremely wary of people and sensitive to danger because of the annual hunting seasons. In western Montana, undisturbed elk used habitats in proportions similar to their availability (Hurley and Sargeant 1990). Disturbance by hunters had little effect on elk living in unroaded areas; however, elk living in areas with open roads spent more time away from roads and in dense cover. Other studies have documented that elk behavior changes in response to the hunting season (Hillis et al. 1991). Elk avoid areas adjacent to roads with vehicular traffic, especially during the hunting seasons. Elk movements are generally confined to habitats within a traditionally used home range but they spend more time in dense cover during hunting season than they do before the hunting season. Elk also respond to hunting pressure by moving to adjacent undisturbed areas or refuges such

as national parks (Thomas and Toweill 1982) or large tracts of private land closed to hunting.

Displacement of elk onto private land is one of the issues with current travel management on the forest. This results in several problems. Elk leave suitable habitat on the forest and go to less suitable but more secure areas on private land. Elk can cause damage to private land. Harvest objectives cannot be met because hunters do not have access to much of the private land, and the desired population reduction through harvest cannot occur. The vulnerability of elk to harvest is greater in roaded habitats than in unroaded habitats (Hurley and Sargeant 1990, Leptich and Zager 1990, Unsworth and Kuck 1990). Studies have documented that bull elk in roaded habitats are more than twice as likely to be killed during the fall hunting seasons as those in areas with very few roads (Unsworth and Kuck 1990). The annual harvest influences the population structure of big game herds as well as hunter opportunities. Areas with high harvest have fewer mature bulls within the population, which can affect herd genetics.

A variety of studies have demonstrated that elk vulnerability may be reduced, and hunter opportunity may be increased, by providing security areas for elk during the hunting seasons.

Habitat Security Areas

The habitat security areas mapped for the forest represent large (minimum of 250 contiguous acres), relatively unfragmented tracts of land. These areas are a minimum of ½ mile from any road or trail open to motorized use. Habitat security areas represent most native ecosystem types and seral stages across their natural range of variation and provide suitable habitats for those species sensitive to fragmentation and disturbance. These habitat security areas help offset the impacts of intensively roaded portions of the forest and contribute to the maintenance of viable populations of native species in natural patterns of abundance and distribution.

Table 3.34—Summary of summer travel management, by miles, on the White River National Forest

Legend	Alternative A	Alternative F	Alternative G
Licensed motorized only	15	15	585
Licensed and unlicensed allowed	1724	1724	850
Motorized vehicles < 50” in width	109	109	143
Motorized two-wheeled vehicles	43	43	67
Mechanized (bicycles)	740	737	596
Foot and horse (pack animal)	1339	1344	1440
Managed under special use permit	126	125	212
Closed to the public but remain on the system	60	59	32
Closed to the public but not decommissioned or rehabilitated	1252	0	0
Closed to the public and to be or already decommissioned/rehabilitated	0	1252	1483
Total	**5408**	**5408**	**5408**

Table 3.35—Security blocks on the White River National Forest

	Alternative A	Alternative F	Alternative G
Number of security blocks	105	105	98
Acres of security blocks	1,427,259	1,427,259	1,498,622
% of forest in security blocks	62%	62%	66%

Alternative A. Existing system roads and trails would continue to be used with the exception that within management areas that have road or trail density restrictions, some roads and trails have been identified for closure to assure compliance with forest plan direction. No unauthorized roads or trails would be added under this alternative, but these routes would not be scheduled for decommissioning in this alternative (except for routes already covered for decommissioning under existing NEPA. Table 3.34 demonstrates the amount of roads and trails left on the system. Table 3.35 displays the number of security blocks across the forest under each alternative. There would be a total of 204 blocks of security habitat that total over 1.4 million acres (62 percent of the forest) under Alternative A.

Alternative F. Alternative F is the minimal action alternative which makes Alternative A compliant with the forest plan direction and all applicable laws and regulations. Under this alternative all user-created routes are rehabilitated. No routes are adopted. No system routes are decommissioned. Tables 3.34 and 3.35 display the number of miles of roads and trails and the number of blocks of security habitat that would be open under this alternative. Although there are fewer numbers of blocks, the total acreage is the same as under Alterative A, indicating that at least some of the blocks are larger.

Alternative G. Alternative G is the preferred alternative and was designed by looking at the DEIS, public input, and implementation of the travel rule. This alternative also looks at which routes should be part of the system and which should be decommissioned or rehabilitated. This alternative has the greatest amount of security blocks.

Important Seasonal Big Game Habitats

Deer and Elk

Animals concentrate on their winter range from as early as October, until late March or April. Mule deer rely almost exclusively on browse species such as gambel oak, sagebrush, mountain mahogany, serviceberry, chokecherry, and bitterbrush. Elk prefer grass but will use browse when grass is unavailable during periods of heavy snow. Elk also tend to winter higher in elevation than deer. Elk and mule deer use the forest primarily as summer range.

Although portions of the forest provide important big game winter range, overall less than 10 percent of the winter range for deer and elk using the White River National Forest during the summer months is located within the forest boundary. Most winter range occurs at lower elevations (6,000 to 8,000 feet) on adjacent private or BLM lands. Important deer and elk winter range is identified within the forest plan as management area 5.41 and some management areas of 5.43. These management areas include most, but not all, of the important deer and elk winter range that occurs on National Forest System lands.

Key elk calving areas are located throughout the forest. The calving grounds identified are preferred calving areas, used annually by elk herds. Many 5.43 management areas delineated in the forest plan protect these important habitat areas. On the White River

National Forest, elk calving occurs from early May to the end of June, with peak activity around early June. Mule deer fawning occurs near the upper limits of their winter range, in lower elevation brush fields and forest ecotones. No specific fawning grounds have been identified on the forest.

Summer concentration areas are generally preferred areas with available cover, feed, water, and space, and are highly influenced by open road density, human activity, forage availability, and presence of cattle. During hunting seasons (late August through mid November) elk seek security areas on the forest and adjacent BLM or private lands. Security areas are remote, unroaded tracts of land that reduce elk vulnerability to harvest.

Threatened, Endangered, and Sensitive Species

Effects on threatened and endangered species are based on the habitats affected and species occurrence. Critical habitats for federally listed threatened and endangered species have not been delineated on National Forest System lands on the White River National Forest. Since no critical habitat has been identified, suitable habitat within the range of the species is considered. Federal candidate and Forest Service sensitive species have no formal critical habitat designation. Many of these species are associated with rare or unique habitats or are disjunct, remnant populations. Impacts can occur on individuals or on the population. A biological assessment (BA) for the forest plan was prepared by the Forest Service in consultation with the U.S. Department of the Interior, Fish and Wildlife Service (USFWS), to determine the effects on federally listed and proposed species. A biological evaluation (BE) for the forest plan was also prepared by the Forest Service to determine the effects on all Forest Service sensitive species and habitat Both of these documents are incorporated by reference into this analysis. Additionally, an updated BA and BE were prepared for this document. They are found as appendices A and B of this document. The reader is referred to those documents for completed impacts analyses for the respective species.

MIS

Amendment 3 to the forest plan (Dated March 6, 2006) revised the management indicator species (MIS) for the White River National Forest. The MIS from this amendment are analyzed in appendix C to address potential impacts on wildlife from implementing the various alternatives. A thorough viability assessment of species found on the White River National Forest was completed as a portion of the forest plan.

American elk is analyzed in depth, above and in amendment C. The following forest plan management indicator species objective applies to elk:

> "Manage motorized and non-motorized travel and recreation management to maintain effective use of habitat by large wild ungulates" (USDA Forest Service/WRNF 2002a).

All action alternatives of the travel management plan meet this objective. Analysis at the DAU and the forest-wide levels indicate that habitat effectiveness would be maintained or improved under all action alternatives.

For cave bats, Brewer's sparrow, American pipit, and Virginia's warbler the analysis completed in appendix C determined that in the action alternatives there may be a slight, long-term beneficial effect on overall habitat for all MIS due to road and trail decommissioning and rehabilitation. These species will continue to be monitored across the forest using the protocols developed as a part of the forest plan.

General Wildlife Habitats

The maintenance and use of routes continues to remove vegetation, logs, and rocks from route corridors. This can result in loss of habitat. The significance of the impact depends on the abundance of habitat, the magnitude of the disturbance, and the resulting fragmentation and isolation of habitats and species. Short-term impacts on habitat and/or individuals could include the loss of a nest or den site. A long-term loss could include a large-scale vegetation removal or fragmentation of old-growth forest habitat or loss of wetlands. The alternatives contain a variety of routes and uses of existing roads and trails. Under the action alternatives, some of the existing roads would no longer be used for travel and would be decommissioned and revegetated over time. There would be a long-term benefit to wildlife habitat as a result of reducing the number of routes. There is a potential for impacts on individual animals from maintenance, use, and decommissioning of roads and trails when they are located within suitable, occupied habitat. Off-route travel is prohibited throughout the forest, but some level of illegal use is expected to continue. This illegal use will continue to affect individuals of some wildlife species. Individuals can be crushed by maintenance equipment and by users on and off route. The most susceptible species are rare plants and those animals with small home ranges and/or low mobility.

For the purposes of discussing potential impacts on a wide range of wildlife species (those not included as management indicator species or as threatened, endangered, or sensitive species, which are discussed in appendices A, B, and C of this document), the forest was organized into the following general habitat classifications: alpine, forested, grassland/forbland, riparian, and shrublands. Analysis for each of these types included the number of miles of roads or trails open to the various use types for each alternative.

Alpine

Alpine areas are defined as areas that rise above the cold limits of trees. There are approximately 304,000 acres (475 square miles, or 13 percent or the forest) of alpine habitats on the White River National Forest. These areas are characterized by having severe weather conditions with very short growing seasons. Soils are generally very shallow and take many years to reestablish following disturbances. Many specialized plants and animals often live life “on the edge” in these rugged environments. One threatened plant, the Penland alpine fen mustard, and many of the sensitive plants that occur on the White River National Forest, occur in this life zone. These plants are discussed in the BA (appendix A) and BE (appendix B). White-tailed ptarmigan and several species of rosy finches have adapted to life in the alpine areas of the forest. Bighorn sheep and Rocky Mountain goat can be found in suitable alpine habitats especially during the summer months, but some areas of winter range are also located on windblown alpine slopes. Elk are often found in alpine habitats during the summer. Analysis for alpine habitats is presented in table 3.36.

Table 3.36—Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)*		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	12.47

**Approximately 475 square miles of potential habitat were analyzed for this species.*

Within alpine habitats, Alternative F does not change any authorized travelways from alternative A. Alternative G reduces authorized motorized use by about 3 miles, mechanized use by 7 miles and foot/horse use by 3 miles. Planned decommissioning of travelways would reduce open authorized travelway density in Alternative G when compared to the current, existing situation and Alternative F.

Forests

The forest category includes all the major forested types across the White River National Forest, including spruce/fir, lodgepole pine, aspen, Douglas-fir, pinyon/juniper, and blue spruce. A total of 1,581,000 acres (2,470 square miles) of forest types are found on the White River National Forest, or approximately 70 percent of the entire forest. A wide range of species of reptiles, amphibians, birds, and mammals use these habitats for various life history requirements throughout the year. These habitats are found from the lower pinyon/juniper stands on the western sections of the forest at about 6,000 feet to the spruce/fir at approximately 11,500 feet, where alpine habitats start. Elk, deer, and bighorn sheep are the species for which the most information exists, documenting potential impacts from various forms of human access to the forest. The great majority of the research done on these species indicates that they show negative reactions to close human intrusions into their habitat. Other species are likely react in similar manners to various degrees to human intrusions. Table 3.37 shows the analysis for forested habitats.

Table 3.37—Travelway densities by alternative for lands within the forested habitats on the White River National Forest

Type of use	Density (miles per square mile)*		
	Alternative A	Alternative F	Alternative G
Motorized	0.47	0.47	0.42
Mechanized	0.20	0.20	0.17
Motorized/mechanized	0.67	0.66	0.58
Foot/horse	0.35	0.35	0.36
Total	1.01	1.01	0.95
Scheduled for decommission (reduction in density)	0.00	0.25	0.30

**Approximately 2226 square miles of potential habitat were analyzed for this species.*

Within forested habitats, Alternative F decreases mechanized access by approximately 5 miles forest-wide, while increasing foot/horse use by 4 miles. Alternative G decreases motorized travelways by 110 miles and mechanized by 69 miles. This alternative increases foot/horse by 39 miles. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in both the action alternatives when compared to the current, existing situation. Alternative G would have the fewest impacts on species that are affected by motorized or mechanized use of forested lands.

Mixed Mountain Shrub

Mixed mountain shrub communities are generally found in the lower elevations and are more common on the western portion of the forest. They constitute approximately 13 percent of the forest (286,000 acres) and are composed of various combinations of the following major shrub types: sagebrush (*Artemsia spp*.), Gambel oak (*Quercus gambelli)*, chokecherry (*Prunus virginianus)*, mountain mahogany (*Cercocarpus montanus*) and serviceberry (*Amelanchier alnifolia*). Analysis for mixed mountain shrub habitats is presented in table 3.38.

Table 3.38—Travelway densities by alternative for lands within the mixed mountain shrub habitats on the White River National Forest

	Density (miles per square mile)*		
Type of use	**Alternative A**	**Alternative F**	**Alternative G**
Motorized	0.99	0.99	0.85
Mechanized	0.27	0.27	0.18
Motorized/mechanized	1.26	1.26	1.03
Foot/horse	0.33	0.33	0.41
Total	1.59	1.59	1.44
Scheduled for decommission (reduction in density)	0.58	0.11	0.44

**Approximately 434 square miles of potential habitat were analyzed for this species.*

For authorized uses within shrubland communities that may support various wildlife populations, Alternative F and A are identical. Alternative G reduces motorized and mechanized road and trail density, and increases foot and horse density over Alternative A. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in all the alternatives. Some additional uses are expected on established travelways by foot and horseback users. Alternative G will have the least impact species that are negatively affected by motorized and mechanized uses.

Grass/Forb Meadows

Approximately 20 percent of the White River National Forest is composed of grass/forb lands (386,000 acres). These communities are made up of a wide range of grasses and forbs; the specific mix of species depends in large part on elevation, slope, and soil types. Table 3.39 presents the analysis for grass/forb meadow habitats.

Table 3.39—Travelway densities by alternative for lands within the grass/forb meadow habitats on the White River National Forest

Type of use	Density (miles per square mile)*		
	Alternative A	Alternative F	Alternative G
Motorized	0.86	0.86	0.74
Mechanized	0.24	0.23	0.17
Motorized/mechanized	1.10	1.09	0.91
Foot/horse	0.61	0.61	0.65
Total	1.70	1.70	1.57
Scheduled for decommission (reduction in density)	0.00	0.34	0.46

**Approximately 557 square miles of potential habitat were analyzed for this species.*
**Approximately 603 square miles of potential habitat were analyzed for these areas.*

Within grass/forb habitats, Alternatives A and F allow approximately the same authorized uses. Alternative G would reduce a total of approximately 65 miles of motorized travelways and 35 miles of mechanized routes, while adding approximately 25 miles of foot and horse access. Planned decommissioning of travelways would reduce open travelway density in Alternatives F and G when compared to the current, existing situation.

Riparian

Although a very limited amount of the forest is classified as riparian (less than 3 percent at 54,000 acres), riparian areas receive a disproportionate share of wildlife and amphibian use. Riparian habitats are generally considered to be diverse in vegetation, amphibian, and animal diversity, due in large part to the presence of water. The communities that make up riparian habitats on the White River National Forest also are diverse, varying from low-elevation cottonwood/willow woodlands along stream channels, to blue spruce/dogwood-dominated forested communities, to high-elevation willow carrs. Table 3.40 presents the analysis for riparian habitats.

Table 3.40—Travelway densities by alternative for lands within the riparian habitats on the White River National Forest

Type of use	Density (miles per square mile)*		
	Alternative A	Alternative F	Alternative G
Motorized	1.03	1.03	0.91
Mechanized	0.52	0.52	0.44
Motorized/mechanized	1.55	1.55	1.35
Foot/horse	0.96	0.96	1.00
Total	2.51	2.51	2.35
Scheduled for decommission (reduction in density)	0.00	0.39	0.52

**Approximately 91 square miles of potential habitat were analyzed for this species.*

Alternatives A and F provide the same authorized uses within the riparian habitats on the White River National Forest. Alternative G reduces both motorized and mechanized uses but does increase the foot and horse access slightly (approximately 4 miles). Planned decommissioning of travelways would reduce open travelway density in Alternatives F and G when compared to the current, existing situation.

General, Direct, and Indirect Effects: Aquatic Systems

General Effects

For this analysis, it is assumed that when a road is closed it is closed effectively such that it ceases to have impacts on the aquatic system. Seventh level hydrologic unit codes (HUCs) were used for this analysis and are referred to here as "catchments." There are 388 catchments wholly or partially on the White River National Forest.

The effects of roads on aquatic organisms are well documented. A synthesis of road impact information can be found in "Forest Roads: A synthesis of scientific information" (Gucinski and Furniss 2000). Some of the key findings from this document that relate to travel management include both physical and biological effects:

Physical effects include:

- "Roads affect geomorphic process by four primary mechanisms: Accelerating erosion from the road surface and prism itself by both mass and surface erosion processes; directly affecting channel structure and geometry; altering surface flowpaths, leading to diversion or extension of channels onto previously unchannelized portions of the landscape; and causing interactions among water, sediment, and woody debris at engineered road-stream crossings."
- "Roads have three primary effects on water: they intercept rainfall directly on the road surface and road cutbanks and intercept subsurface water moving down the hillslope; they concentrate flow, either on the surface or in an adjacent ditch or channel; and they divert or reroute water from flowpaths that it would otherwise take if the road were not present."

These physical effects lead to the following biological effects:

- "Increased fine-sediment composition in stream gravel has been linked to decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes."
- "The effects of roads are not limited to those associated with increases in fine-sediment delivery to streams; they can include barriers to migration, water temperature changes, and alterations to streamflow regimes."
- "Road-stream crossings have been shown to have effects on stream invertebrates. Hawkins and others found that the aquatic invertebrate species assemblages (observed versus expected based on reference sites) were related to the number of stream crossings above a site."
- "Several studies at broad scales document aquatic habitat or fish density changes associated with road density or indices of road density."

Effects of the travel management plan were determined by analyzing three indicators: total road miles or road density by catchment, total road miles within 300 feet of streams or rivers by catchment, and number of road crossings by catchment. Roads only were selected for this analysis since, in general, they have greater impacts on aquatic systems than trails due to their larger size and level of disturbance. Winter use was not analyzed since there is no associated ground disturbance.

Road Density

Table 3.41 displays the total number of open roads and the forest-wide road density for all alternatives. Although road density generally decreases in each action alternative, in

localized areas alternative G has more miles than alternative A-the no action alternative, which although there are improvements in some watersheds, others are more impacted.

Table 3.41—Miles of road and road density by alternative

	Alternative A	Alternative F	Alternative G
Miles of road	2610	2339	2050
Average road density (miles per square mile)	0.73	0.65	0.57

Roads Within 300 Feet of Streams

The closer a road is to a stream system, the greater the impacts on the stream and the organisms inhabiting it. Roads directly adjacent to streams can impact streams by channelizing the stream, eliminating streamside vegetation, and introducing sediment into the stream. Road-stream crossings are addressed separately.

Table 3.42 displays the total miles of maintenance level 1 and 2 roads, the percent of all ML 1 and 2 roads, and the proportion of roads to be closed within 300 feet of streams and rivers for all alternatives. Alternative A has the greatest length of open road within 300 feet of streams and rivers, followed by Alternative F. Alternative G has the least amount of road within 300 feet of streams and rivers. The percent of the road system within 300 feet of streams and rivers is consistent in all alternatives and the roads closed near streams and rivers are proportional to the overall road distribution. There are six catchments and subwatersheds with at least 5 miles of ML 1 and 2 road within 300 feet of a stream in one or more alternative (table 3.43).

Table 3.42—Miles of maintenance level 1 and 2 roads within 300 feet of streams and rivers, and the proportion of open roads and road closures within this area

	Alternative A	Alternative F	Alternative G
Miles of ML 1 & 2 road within 300 feet of streams	642	544	454
% of ML 1 & 2 roads within 300 feet of streams	33.0%	32.5%	32.6%
% of road closures* within 300 feet of streams	n/a	36.2%	33.9%

**Road closures are changes from Alternative A*

Table 3.43—Subwatersheds on the White River National Forest with at least 5 miles of maintenance level 1 and 2 road within 300 feet* of a stream or river

Watershed Name	Alternative A	Alternative F	Alternative G
Swan River	22.2	20.1	17.6
Green Mtn Reservoir Composite watershed	10.3	10.1	6.0
Straight Creek	7.7	2.7	4.5
Upper Snake	6.9	6.5	7.2
Peru Creek	6.9	5.8	6.8
Deep Creek (Blue River)	5.8	4.1	2.8

**Road miles within 300 feet are presented for all alternatives*

Road-stream Crossings

Road-stream crossings are areas where the impacts of roads are the greatest in terms of channel impacts, sediment, and potential movement barriers. Numbers of crossings presented in this section are not accurate and may be overestimated by up to 30 percent due to inaccuracies in our GIS data layers. Although not all of the crossings discussed in this section are true stream crossings, if a road segment comes close enough to the stream for it to be considered a crossing, it is probably an area of acute road impacts, though not necessarily a barrier. While absolute counts of stream crossings in this analysis are not reliable, the relative differences between alternatives is considered "very good" since the same line sets were used for each alternative (the difference is whether they are open or closed). Stream crossings from maintenance level 1 and 2 roads occur in 178 of 388 catchments. Alternative F has a 16 percent reduction in the number of stream crossings, and Alternative G has a 29 percent reduction in stream crossings (table 3.44).

Table 3.44—Number of maintenance level 1 and 2 road crossings by type of stream for each alternative

Type of stream	Alternative A	Alternative F	Alternative G
Perennial	407	330	294
Intermittent	1012	859	722
Swale	812	675	571

Macroinvertebrates

Aquatic macroinvertebrates are those invertebrates that spend at least part of their life cycle in water. These include worms, mollusks, mites, and insects. Insects are by far the most common. Most insect species spend just the immature phase (larval or nymph phase) in water.

Macroinvertebrate communities occur in all water bodies on the White River National Forest, including ponds, lakes, reservoirs, wetlands, rivers, perennial streams, and intermittent streams. Even degraded systems usually contain aquatic macroinvertebrates, however these communities look very different from those in pristine systems. Because of their wide distribution and their sensitivity to disturbance and pollutants, macroinvertebrates are widely used to monitor the health of streams and rivers.

Macroinvertebrate communities are influenced by the timing of flow and water quality in the streams in which they live. Geology, elevation, temperature, gradient, and substrate distribution are other factors that commonly influence macroinvertebrate communities. As habitats are degraded, either by chemical pollutants, increased sediment, or unfavorable changes in flow (especially severe reductions), the response of the macroinvertebrate community is typically a reduction in the number of species which occur there, and especially the number of sensitive species.

All alternatives improve the current situation by removing roads that currently exist (see discussion above under "Aquatic systems – general effect"). In the years following this decision, actions will occur to that reduce the impact of these roads. Expected treatments range from allowing a road to revegetate naturally to active recontouring. Some roads will be converted to trails. It is expected that the footprint of the travelway will be reduced when roads are converted to trails. Overall, this project is expected to improve trends in macroinvertebrate populations forest-wide by reducing the impacts of roads currently existing. The magnitude of this improvement varies by alternative, with Alternative F offering the least amount of improvement and Alternative G offering the greatest amount of improvement to forest-wide trends.

Fish

Although the primary risk factors for fish species are biological (exotic species and to some degree disease), roads can further impact these populations by creating barriers to fish movement, degrading habitat by constraining streams and eliminating riparian vegetation, introducing sediment, and providing angler access.

Colorado River Cutthroat Trout

There are 32 subwatersheds containing at least one conservation population of Colorado River cutthroat trout. The revised forest plan has a standard stating that total road density in subwatersheds containing conservation populations of Colorado River cutthroat trout may not be increased. Thirty-one watersheds with a conservation population meet that standard. **One watershed (the Blue River around Breckenridge [HUC 140100020506]) meets the standard in Alternative F, but not in Alternative G.** This subwatershed comprises 11 catchments, two of which contain conservation populations of Colorado River cutthroat trout. In these two catchments, French Gulch and Spruce Creek, while the analysis shows that the ML 1 roads are added, they are only to be used as trails. The recommendation for the final transportation management plan is to accept these ML 1 roads as trails to keep the road density down. It is also important to keep in mind that these roads are already present and not true additions, however our goal is to reduce road density in Colorado River cutthroat trout watersheds. The total road mileage and density for all subwatersheds with conservation populations of Colorado River cutthroat trout are presented in Table 3.45. A substantial number of roads are removed in all action alternatives, with Alternative G removing 20 percent of the existing road mileage. Removal of these roads would have a long-term benefit on Colorado River cutthroat trout. It is possible that reclamation activities would have a short-term negative effect due to sediment and possible direct channel impacts if crossings were removed.

Table 3.45—Total road miles and road density (in miles per square mile) for all 6th level watersheds containing a conservation population of Colorado River cutthroat trout

	Alternative A	Alternative F	Alternative G
Total miles	586	531	466
Total road density	0.64	0.58	0.51
Miles removed (compared to Alt. A)	n/a	55	120
% of miles removed (compared to Alt. A)	n/a	9%	20%

The total miles of roads and trails by use within 350 feet of known occupied cutthroat habitat are presented in Table BE-24 (appendix B). These include all cutthroat trout regardless of genetic purity. In total, motorized uses decrease slightly adjacent to occupied cutthroat trout habitat for Alternative G and do not change at all in Alternative F. In Alternative G, the level of use is reduced along 10 miles of travelway within 350 feet of occupied cutthroat stream and it is eliminated along another 10 miles. Roads would be decommissioned where travel has been eliminated. In most cases, motorized use is removed along cutthroat streams in Alternative G with three exceptions: two-tenths of a mile of road are added within 350 feet of Indiana Creek, almost a half mile is added in the Upper Main Elk watershed, and about a tenth of a mile of new ATV trail is added along Fawn Creek (presumably a crossing). Although in general, reduction of motorized use adjacent to occupied cutthroat streams has a positive long-term effect, negative effects are expected in the three populations discussed above.

Greenback Cutthroat Trout

Recent improvements in genetic analysis techniques appear to have made it possible to differentiate Colorado River cutthroat trout from greenback cutthroat trout. Although this differentiation is still considered somewhat preliminary, it is considered best available science and therefore populations identified as "GBlineage" are considered greenback cutthroat trout. The White River National Forest has five populations to date which have been identified as GBlineage: Three Licks Creek, Frey Gulch, Cunningham Creek, Park Creek, and Cache Creek. Twenty-five miles of roads are removed from the GBlineage watersheds. Some are converted to motorized trails and others are scheduled for decommissioning. Four of these watersheds would have roads decommissioned within the occupied part of the watershed. The fifth (Cache Creek) also has a trail along the creek which would be removed from the system (allowed to revegetate). There may be short-term negative impacts on these populations from decommissioning activity, however, the long-term effect would be beneficial. Alternative G decommissions more roads than Alternative F, but both offer a long-term benefit over Alternative A.

Table 3.46—Comparison of roads and motorized trails in each alternative in watersheds containing a cutthroat trout population believed to be greenback cutthroat trout

Roads and trails by alternative	Population (watershed)*				
	Three Licks (Big Hole Creek)	Frey Gulch (Frey Gulch)	Cunningham (North Fork Fryingpan)	Park Creek (North Thompson)	Cache Creek (Cache Creek)
Alt. A – roads	3.73	5.37	30.97	28.41	0.36
Alt. A – trails	0	1.42	0	0	0
Alt. F - roads	3.73	5.37	30.97	21.39	0.36
Alt. F – trails	0	1.42	0	0	0
Alt. G – roads	1.24	1.03	19.87	20.76	0.36
Alt. G – trails	2.11	5.57	8.98	0	0

**The subwatershed or catchment containing the population used for analysis is in parenthesis below the population name.*

Mountain Sucker

Mountain sucker occur primarily in the White River drainage on the White River National Forest. They are more sensitive to sediment than other local sucker species and therefore could be negatively impacted by increased road densities, or in the short term by road decommissioning activities. Road densities in occupied watersheds in general remain stable in Alternatives F and G, with a large decrease in road density in Deep Creek where mountain sucker have been reported.

Bluehead Sucker

Bluehead sucker occur primarily downstream of the forest, with the exception of the West Divide Creek watershed. Bluehead sucker are not known to be sensitive to sediment. Both Alternatives F and G reduce the road density significantly in this watershed and would therefore have a long-term beneficial effect on bluehead sucker, although the short-term impact from decommissioning activities may be slightly negative.

Roundtail Chub, Flannelmouth Sucker, Colorado Pikeminnow, Humpback Chub, Razorback Sucker, and Bonytail

These species all occur downstream of the White River National Forest in the Colorado, White, and Yampa rivers, and in some warmer tributary streams on the west side of the White River National Forest. The primary threat to these species from activities on the White River National Forest is water depletion. The proposed action does not call for any change in water distribution or use and therefore will not directly or indirectly affect these species.

Amphibians

Hydrologic alteration of breeding ponds and the risk of disease are the primary threats to amphibians from travel management. Little is known about how disease moves through the system, but it is logical that increased human contact and disturbance could increase the risk of disease introduction to breeding ponds. Ideally, all travelways should be at least 300 feet away from breeding ponds. In addition to the risk of spreading disease, increased motorized and non-motorized use increases the risk of harassment or death of individuals.

An analysis of known breeding sites for the boreal toad and northern leopard frog for all alternatives show no change in roads or trails for Alternative F and changes to two populations in Alternative G. For the Montezuma boreal toad population, 0.21 miles of mountain bike trail are added within ½ mile of the breeding pond in Alternative G. For the Sterry Lake leopard frog population, 0.34 miles of road and 1.7 miles of ATV trail would be removed within ½ mile of the breeding lake. The ATV trail to be eliminated comes within 300 feet of the breeding lake. Therefore, Alternative F will have no impact on these species compared to the no action alternative. Alternative G would have a potential minor negative impact on boreal toads and would have a long-term beneficial effect on leopard frogs (with a short-term negative effect from the disturbance associated with obliterating/closing these travelways).

Cumulative Effects for Terrestrial and Aquatic Wildlife Species

Past, present, and future actions that affect fish and wildlife on the forest include: vegetative management activities, oil/gas and mineral production, private land development, other transportation management decisions either on the forest or on surrounding lands, recreation activities, livestock grazing, fishing, big game hunting season regulations, and natural events. All these activities alter or increase human activity and change ground conditions in some regard, thus affecting wildlife living conditions and habitat quality.

Commodity production increases the use and demand on the travel system and can lead to temporary or permanent expansion of the road system. These activities can affect wildlife solitude and habitat forage, fragment migration routes, and add sediment to waterways. Individual projects may not have large impacts; however, when a large area is being developed with many projects, considerable cumulative impacts may occur. Some of the impacts can be reduced by developing efficient transportation systems and engineering roads with drainage features that help keep waterways at desired conditions for these areas.

Private land, especially in the main valleys, continues to be developed. This development causes displacement and fragmentation of wildlife. It also places a higher demand on water, which can increase the need for high-quality water and wildlife refuge on the forest. Isolated populations of animals and human-animal conflicts can result from

activities such as the proposed I-70 expansion and development patterns that dissect migration. If mitigations such as open space and wildlife crossings are implemented, animals may continue to migrate to different parts of the forest.

As human population and tourism increase in the area, more people will recreate on the forest. Consequent increases in the human influence on wildlife can cause accelerated changes in wildlife patterns. Furthermore, the more people disperse across the forest, the greater the chance for noxious weed spread, which has a direct effect on habitat forage and the quality of feed for animals.

Short-term Uses and Long-term Productivity

The National Environmetnal Policy Act requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Alternatives B, E, D, and C, from most to least, have the potential to improve long-term productivity by reducing the number of miles and trails on the landscape. Once decommissioned, these areas will have the potential to revert to vegetated conditions.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as power line rights-of-way or roads.

The implementation of any of the alternatives, including the no action alternative, would have no irreversible commitment of resources. The alternatives define the road and trail system, consider adoption of some unauthorized roads and trails into the system (except Alternative B, F? which does not consider adoption of unauthorized roads and trails), and propose decommissioning of roads and trails not needed for the transportation system. None of the alternatives consider new construction. Roads and trails can be rehabilitated when no longer needed as part of the transportation system.

Irretrievable commitment of resources would occur under all alternatives. Irretrievable commitments of resources from roads and trails exist because the travelway changes the natural landscape to a non-natural, out-of-vegetative-production landscape. The road and trail designation of the selected alternative would create temporary losses associated with maintenance of forest roads and trails. Resources affected would be scenery, vegetation (including range and timber), and associated wildlife habitats. Implementation of any of the alternatives would commit these resources over the life of the road or trail.

The alternative with the highest number of miles of designated roads and trails would also cause irretrievable commitments of the most resources. The alternatives ranked from most to least for irretrievable commitment of resources are alternatives C, D, E, and B.

Cumulative Effects

Cumulative effects are discussed under each resource section in chapter 3 and in appendixes A, B, and C as appropriate. The following discusses the past, present, and future activities that may have a potential for cumulative effects based on the travel management plan alternatives proposed in this document. The geographic scope of this discussion is the planning area and the surrounding dependent communities. The temporal scope of this discussion is the planning horizon, typically 10 to 15 years.

Past activities are those activities whose effects are still present on the landscape. They include roads built for timber production and mineral exploration, access to private lands and towns, and recreation access. Past activities also include trails that were built for recreation access and use, and livestock access and distribution. Several miles of non-system roads and trails have been created through repeated use, or are remnant from inadequate closure. Approximately 1,045 miles of non-system (unauthorized) roads and trails, and approximately 4,590 miles of system roads and trails exist across the forest. Currently, approximately 2,000 miles of the system roads and trails are National Forest System roads and 1,950 miles are National Forest System trails.

Present resource activities include vegetation treatments for wildlife and fire under the Healthy Forest Initiative; oil and gas exploration on the southwestern part of the forest; livestock grazing; and a little mining. The highest use across the forest is recreation; the area has and will continue to be one of the premier destination locations for vacationers. These activities will continue into the future.

Future activities are those reasonably foreseeable actions that may add to the cumulative effects on forest resources and social impacts. The forest plan stated a goal of road reduction across the forest. This goal was established to align the forest with the national goal for forests to “determine and provide for the minimum forest transportation system that best serves current and anticipated management objectives and public users of National Forest System lands, as identified in the appropriate land and resource management plans” (USDA Forest Service 2001a). It is reasonable to consider that the implementation of the forest plan will include a reduction in the amount of roads.

The opportunities for locals to enjoy the forest have led to an increase in population in the area. Many people have moved to the area for the recreational opportunities, especially downhill skiing. The economies of the resort communities are directly related to the activities the forest provides. Indirectly, even off-forest towns, where many of the resort employees reside with local residents, benefit from expenditures and necessities of the resort communities. These trends will likely continue into the future.

The Federal Highway Administration initiated a study to expand the capabilities of the I-70 corridor because of demand from the Denver area to transport people to the resort towns. Execution of the plan will take more than 20 years. It will increase the transportation capabilities of I-70 and allow more people to come to these resort communities at one time. It would make traveling to and through the area easier and more desirable by tourists. Many of these travelers will likely use the forest for their recreation.

Although new technologies in recreation are likely to occur over the planning period, recognizing cumulative impacts from them is speculative at this stage. This plan is not the final action in travel opportunities on the forest; rather, this is a programmatic document that sets the stage for our anticipated needs currently and in the future. If other needs arise, specific projects can be designed to address them.

Selection of any of the alternatives as the travel management plan will identify where and when different modes of transportation can occur across the forest. The travel management plan will establish the transportation system so the forest can concentrate resources to the identified system and reestablish native conditions in areas where the system is not needed. The variability of the alternatives is constrained by the mandates in the forest plan. The variability among alternatives is extremely small when viewed against the entire acreage of the planning area.

The likely increase in the I-70 corridor population, the increase in the ability of recreationists to access the forest from Colorado's Front Range, and the forest plan objective to decrease roads will affect forest resources including recreation. The selection of one alternative over another is unlikely to measurably add to those effects. The selection of one alternative over another is unlikely to change the expected population growth patterns or legal use patterns.

Cumulative impacts on forest resources would be based on the amount, timing, and location of the expected increases in recreation use. It is reasonable to expect that there may be local cumulative impacts on resources from the adoption of one alternative over another; however, across the forest the effects are very small. Those local effects may present themselves in a social context (such as increased crowding and user-conflict) or in a physical context (such as soil erosion on a specific trail). Those issues are best addressed site specifically through available management methods.

CHAPTER 4: CONSULTATION AND COORDINATION

Preparers and Contributors

Contributors

Contributors include all members of the White River National Forest. Site-specific information was developed by the personnel of the seven ranger districts that make up the White River National Forest. Leadership team members gave support and guidance to the travel management planning process.

The White River National Forest would like to acknowledge the members of the public who took the time to engage in the travel management plan effort.

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Distribution of the Supplemental Draft Environmental Impact Statement

This supplemental draft environmental impact statement has been distributed to over 900 individuals and organizations who specifically requested a copy of the document. In addition, copies have been sent to federal agencies, federally recognized tribes, state and local governments, and organizations representing a wide range of views regarding travel management on the White River National Forest.

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APPENDIX A: BIOLOGICAL ASSESSMENT

Introduction

The purpose of this BA is to document the likely effects of the proposed action of the forest-wide travel management plan to federally listed proposed, threatened, and endangered species. The action area for this BA is the lands within the White River National Forest boundary. Decisions made based on the travel management plan BA will pertain only to National Forest System lands; lands under other ownerships will not be affected by decisions made under the proposed action and will not be addressed.

Consultation History

The actions associated with travel management that were included in the decisions made during the revision of the forest plan in 2002 (USDA Forest Service/WRNF 2002a) were included in the consultation for that decision. These actions include management area delineations, including standards and guidelines regarding travel management; recreation opportunity spectrum delineations; and forest-wide standards and guidelines concerning travel, including restrictions of summer motorized and mechanized travel to designated routes only. No consultation has occurred on the site-specific decisions being made based on results of this document.

A programmatic Biological Opinion for Bureau of Reclamation's operations and depletions, other depletions, and funding and implementation of recovery program actions in the Upper Colorado River above the confluence with the Gunnison River was completed in December 1999 covering Colorado pikeminnow, razorback sucker, humpback chub, and bonytail. The historic depletion associated with this project is expected to fall under this programmatic biological opinion. There is no programmatic consultation to tier to in the White River drainage.

Purpose of and Need for Action

The purpose of this initiative is to identify the transportation system with the goal of balancing the physical, biological, and social values of the forest. It responds to several needs:

Need: To identify an official designated travel system on the White River National Forest

Need: To identify what is not on the official designated travel system on the White River National Forest and be able to restore lands back to their natural state.

Need: Designate a travel system that is aligned with the Forest Service mission including the need to manage the land by providing a system that attempts to balance social and resource demands.

Decisions to be Made

The travel management plan is an assessment of how and where travel should occur on the forest. The development of this document is an accumulation of ideas, concepts, and analyses from forest specialists, district personnel, other agency personnel, and interested members of the public.

The decisions to be made in the travel management plan are:

1) Designation of the summer road and trail system:
   a) Defining the designated forest roads and trails;
   b) Defining what modes of travel are accepted on each road and trail;
   c) Deciding whether to incorporate or rehabilitate user-created routes;
   d) Determining if certain forest routes are no longer needed as part of the system and identified those for decommissioning.
2) Designation of winter uses:
   a) Designating open areas and routes for motorized use by vehicles made for over-snow travel.

Species Considered and Species Evaluated

On March 8, 2008 the U.S. Department of the Interior (USDI) Fish and Wildlife (FWS) approved the White River National Forest list of threatened, endangered, and candidate species (table BA-1). The following species were listed as potentially occurring on the forest or as potentially affected by management actions occurring on the forest: Canada lynx, Mexican spotted owl, Uncompahgre fritillary butterfly, and Penland alpine fen mustard. These species will be evaluated in this BA.

DeBeque phacelia and boreal toad are both federally listed candidate species that are listed as "warranted, but precluded", because of higher priority for listing other species. Potential impacts to both species are analyzed and included in the BE.

Table BA-1. Threatened, endangered, and candidate species found on the White River National Forest*

Category	Species	Status
Terrestrial animals	Canada lynx	Threatened
	Uncompahgre fritillary	Endangered
	Mexican spotted owl	Threatened
Terrestrial plants	Penland alpine fen mustard	Threatened
Aquatic species	Colorado pikeminnow	Endangered
	Humpback chub	Endangered
	Razorback sucker	Endangered
	Bonytail	Endangered
	Greenback cutthroat trout	Threatened

**Aquatic species all occur downstream of the White River National Forest in the Colorado, White, and Yampa rivers. The primary threat to these species from activities on the WRNF is water depletion.*

Evaluated Species Information

All the species included in the approved species list from the USFWS were described and analyzed in the BA for the forest plan. The basic life history information included in that document is considered up-to-date and valid for this document and will not be repeated here. The only new forest occurrence records since the release of the forest plan are for lynx. Radi location information indicates that several lynx have been using portions of the forest, mainly south of Interstate 70. No other occurrence records have been

documented for any of the other species, so distribution information included in the forest plan BA is considered valid.

Environmental Baseline for the Species Evaluated

Most of the activities that have had affects on the White River National Forest lands occurred prior to the signing of the forest plan and are described in the BA for that document. Since the approval of the forest plan, several areas of the forest have seen wide-spread beetle epidemics that have affected large areas of forested stands in both spruce and lodgepole pine. These epidemics currently are centered around the Fourmile Creek/Baylor Park area and Triangle Park for spruce bark beetle and throughout Eagle and Summit Counties for mountain pine beetle on lodgepole pine. An increase in the development for natural gas has occurred on the western portion of the forest, and several of the ski areas have undergone expansions, but other activities have been minor in scope and have not changed the basic appearance or function of the forest. The forest updates lynx habitat changes when projects are applied to the land. The current (May 2008) information for forest-wide lynx habitat is included in table BA-2.

Table BA-2. Baseline lynx habitat on the White River National Forest, December 2008.

Total White River National Forest acreage	Total non-NFS* acreage	Denning habitat	Winter foraging habitat	Other habitat	Currently unsuitable habitat	Total habitat	Percent currently unsuitable habitat
----------Acres----------							
2,504,131	195,041	449,946	316,593	344,665	44,125	1,155,329	3.8 %

Management Area Prescriptions

The forest is made up of a variety of repeating management area prescriptions (MA) under the forest plan. Each MA provides various levels of management activities that are allowed or prohibited based on the theme and desired future condition for the MA. Each MA has a set of desired condition statements, standards and guidelines that drive the type and amount of management for that MA. Some MAs prohibit motorized and mechanized travel, while others allow mechanized but not motorized travel, and others prohibit motorized travel during the summer while allowing it during the winter months.

Assumptions

Assumptions were made concerning the effects of the travel management plan as it relates to species analyzed. These assumptions are used for the BA, BE, and MIS reports.

- No new road or trail construction is considered in the proposed action.
- The only new ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails.
- Changes will be made to the category of uses among motorized, mechanized, and non-motorized/non-mechanized uses that will result in various levels of impacts on individual species across the forest.

- There will be two types of impacts on species: (1) impacts related to the actual footprint of the road or trail affecting habitat, and (2) disturbance activities resulting from the use of the travelways.
- Each species discussed may have different reactions to motorized, mechanized, or non-motorized/non-mechanized use.
- Decommissioning of identified travelways may take years to be fully rehabilitate and resemble surrounding habitats.
- Alternative A, the No Action Alternative, is considered the current, existing situation on the forest. Alternative A is not compliant with direction in the forest plan. There are a significant number of user-created roads and trails on the forest that are identified under this alternative. These ways are not a part of the legal White River National Forest transportation system. Motorized or mechanized use of these routes is not legal. There currently is some level of illegal activity from both motorized and mechanized users on some of these ways on the forest. This illegal use does create some level of impacts to wildlife. The level of illegal use is likely to be more prevalent where prisms remain on the ground. Each of these user-created routes will either be incorporated into the system or decommissioned under Alternatives F or G. The less user-created routes left on the landscape the less chance of disturbance to wildlife is likely to occur. The analyses concentrate on what legal uses occur on each system by alternative.
- Alternative F is a minimal action alternative that makes Alternative A compliant with the current forest plan, current laws and direction. For the majority of the analyses completed for wildlife species, below, the results for alternative A and F are very similar or identical. Alternative A differs from alternative F in that action would be taken to rehabilitate user-created routes in alternative F. Motorized and mechanized human use currently occurring on user-created routes impact wildlife in a variety of ways. That use will be unauthorized on those routes scheduled for rehabilitation, and those impacts should be ameliorated as the routes are reclaimed.
- Alternative G is the preferred alternative based on the analysis from the original DEIS, public input, and the application of the national motorized use rule.
- Many of the tables displayed in this document standardize the changes in travelways for comparison purposes. To make comparisons of differing types of habitats and differing sizes of habitats for the various species considered, most analyses use density of miles of travelway per square mile of habitat or the amount of change in travelway density for each alternative rather than the total number of miles of change within a habitat over the entire forest. For example: the addition of 10 miles of road within a species range of only 20 square miles of habitat would normally be more significant than the addition of 10 miles of road within 1,000 square miles of habitat for another species. Standardization of the analysis displays this as 0.5 new miles of travelway per square mile of habitat in the first scenario, compared to 0.01 miles of travelway per square mile of habitat for the second. It is felt that this comparison is more meaningful than a comparison of total miles of road or trail for each alternative. Similarly, it is felt that more meaningful comparisons among alternatives can be made by using the amount of change based on miles per square mile rather than overall number of miles of change for a relatively large land base across the forest.

- Travel-management-related impacts on wildlife vary with the volume, timing, and type of travel; the species of wildlife in the area; the habitats involved; time of day or season of year; and a myriad of other factors. Several recent literature reviews of recreation impacts on wildlife have been completed. Literary reviews include: Effects of Winter Recreation on Wildlife of the Greater Yellowstone Area: A Literature Review and Assessment (Olliff et al. 1999); Effects of Recreation on Rocky Mountain Wildlife Habitat (Joslin and Youmans 1999); The Environmental Impacts of Recreation: A Bibliography (Anon. 1999); Forest Roads: A Synthesis of Scientific Information (USDA Forest Service 2000c); Wildlife and Recreationists: Coexistence Through Management and Research (Knight and Gutzwiller 1995); Effects of Off-road Recreation on Deer and Elk (Wisdom et al. 2004)); The Effects of Highways on Elk (*Cervis elaphus*) Habitat in the Western United States and Proposed Mitigation Approaches (Ruediger et al 2006); and the Colorado Division of Wildlife 2006 report on the Colorado Inventoried Roadless Areas Petition.These exhaustive reviews of past studies contain a wealth of information concerning the impacts on wildlife from vehicular and other types of recreation use. Many of the reports cite effects of roads such as:
    a) Habitat fragmentation,
    b) Isolation of rare and unique habitats such as bogs or alpine areas,
    c) Direct effects such as collisions with animals,
    d) Physical destruction of habitats,
    e) Abandonment of habitats, and
    f) Physiological reactions to stress related to the impacts of travel management.

The widespread, detrimental impacts of human disturbance on wildlife are well documented throughout these reports. No positive benefits to wildlife have been identified from increases in travel management access. Direct and indirect effects on wildlife that have been identified in the literature indicate negative impacts to all studied species as motorized, mechanized and foot and horse uses increase.

Effects of the Alternatives on the Species Evaluated

Uncompahgre Fritillary Butterfly

Direct and Indirect Effect

The following information adds to that found on pages 19–21of the BA for the forest plan (USDA Forest Service/WRNF 2002b, appendix N). The Uncompahgre fritillary butterfly (*Boloria acrocnema*) occurs only in alpine tundra habitats above 12,500 feet. All known colonies of this invertebrate inhabit snow willow (*Salix reticulata* L. ssp. *nivalis* Hooker) above 12,500 feet (Wallis et al. 1994). Suitable habitat has been reported in the Maroon Bells Wilderness and along Independence Pass; however, no colonies of this butterfly have been documented through surveys in these areas thus far. Potential habitat has been identified as far north as Interstate 70 in the 10-mile range (Terry Ireland, USFWS, pers. comm.) but no populations have been documented there. No populations of this species have been reported or found during surveys from the White River National Forest. The nearest known population is south of U.S. Highway 50, south of Monarch Pass, approximately 40 miles south of the White River National Forest.

Uncompahgre fritillary butterflies require snow willow habitat found above timberline. Approximately 304,000 acres (475 square miles, or 13 percent of the forest) of the White River National Forest is considered to be alpine; 5,800 acres (less than 1 percent of the forest) is above the 12,500 feet considered to be the minimum habitat for this species.

The primary threats to known populations of the Uncompahgre fritillary butterfly are intensive collecting pressure; intensive grazing or trampling by humans and domestic livestock; disease; parasitism; predation; and periods of prolonged drought conditions (Wallis et al. 1994). Construction of new roads or trails in snow willow habitats could potentially affect the habitat or populations for this species. Until populations are identified and studied on the White River National Forest, it is assumed that these threats are the same on this forest as they are elsewhere. The only identified threat that may be influenced by the decisions in the travel management plan is trampling by humans. Access provided by the roads and trails discussed in the travel management plan has the potential to provide for human intrusion into potential Uncompahgre fritillary butterfly habitat. No new ground-disturbing activities other than routine maintenance and road and trail decommissioning will occur under this proposed action.

The travel management plan would not directly increase collecting pressure. However, any increase in access into high alpine areas that are potential habitat for this species could lead to more people using the areas, with a consequent increase in the potential for collecting activities. No changes in the amount, distribution, or timing of domestic livestock grazing would occur because of the decisions made under any of the alternatives. Drought is outside of the control of the Forest Service and will not be affected by actions allowed under any alternative. No new trail or road construction is being proposed under this action; therefore, no construction activities would occur that might affect this species due to the proposed action or any alternative. Because of planned decommissioning and rehabilitation of roads and trails, all action alternatives would result in an overall reduction in the number of miles of roads and trails in potential Uncompahgre fritillary butterfly habitats.

The analysis for Uncompahgre fritillary butterfly included miles of roads and trails by use type by alternative associated with willow habitats above 12,500 south of Interstate 70, excluding the Hoosier Pass to Loveland Pass area (table BA-4). The Hoosier Pass-Loveland Pass area was removed from consideration for this species based on information concerning potential habitats (Terry Ireland, USFWS, pers. comm.).

Table BA-4. Miles of roads and trails, by use type, for willow-associated lands above 12,500 feet, south of Interstate 70 and excluding Hoosier Pass to Loveland Pass, for each alternative.*

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.00	0.00	0.00
Mechanized	0.04	0.04	0.04
Motorized/mechanized	0.04	0.04	0.04
Foot/horse	0.21	0.21	0.24
Total	0.24	0.24	0.27
Scheduled for decommission (reduction in density)	0.00	0.08	0.04

**9 square miles*

For Uncompahgre fritillary butterflies, alternative G would slightly increase foot and horse trails over alternative A. Although the entire forest is open foot and horse use, this may result in a slight increase over alternatives A and F in the potential recreation use of

these areas due to increased identified access. Under alternatives F and G, roads and trails are scheduled for decommissioning or rehabilitation, with the largest number planned under alternative F. Compared to the existing condition, alternatives F and G would result in reduced road and trail densities in Uncompahgre fritillary habitat due to decommissioning of roads and trails.

The forest plan has specific direction included to protect Uncompahgre fritillary butterfly habitat and populations (USDA Forest Service/WRNF 2002a, page 2-22). These two standards state that:

1) Before any ground-disturbing activity (such as trail building), livestock driveways, or bedding grounds are allowed in potential Uncompahgre fritillary butterfly habitat, a survey shall be conducted to determine the presence of the species. Potential habitat and survey protocols are found in the recovery plan. Avoid actions that would negatively impact the species' known habitat or populations.
2) If any new Uncompahgre fritillary butterfly populations are discovered, a "no-collecting" regulation shall be placed on the area.

Winter

The majority of the fritillary habitat on the White River National Forest occurs within designated wilderness where motorized travel is prohibited year-round. The high elevation and inaccessibility of potential fritillary habitat on the forest makes it unlikely that there would be high levels of winter use. In areas where motorized travel may occur, the forest plan prohibits over-the-snow motorized vehicle use where it would cause soil or vegetation resource damage. Winter recreation use is not identified as a limiting factor for this species. There would be no direct impacts to Uncompahgre fritillary butterflies from any of the alternatives since this species overwinters as egg cases that would not be affected by winter uses of the forest. Indirect impacts would be limited to the unlikely impacts to snow willow stands from motorized or non-motorized use. The potential for detrimental impacts to snow willow stands from any of the alternatives is felt to be very unlikely to occur anywhere on the forest.

Cumulative Effects

This draft environmental impact statement covers all National Forest System lands within the proclaimed boundary of the White River National Forest. As such, it does not cover any changes in the travel management options or other activities on private or state lands within the proclaimed national forest boundary. This species has been recorded only above 12,500 feet in elevation. The only private lands that occur at that elevation within the boundary of the White River National Forest are mining claims where no development has been identified that is reasonably certain to occur in the future. The Forest Service is actively acquiring these isolated, high-elevation mining claims. No state lands are within or adjacent to Uncompahgre fritillary butterfly habitat on the White River National Forest. No other actions on private or state lands have been identified that would affect the potential habitat for this species.

Mexican Spotted Owl

Direct and Indirect Effects

The following information is in addition to that found on pages 6 to 9 of the BA for the forest plan (USDA Forest Service/WRNF 2002b, appendix N). None of the alternatives would result in any new construction of roads or trails on the forest. However, some

current, existing user-created roads and trails may be added to the forest transportation system. A maximum of 6.58 miles of these currently user-created roads and trails would be added for foot and horse access under alternative G within a 2-mile radius of potential habitat for the Mexican spotted owl (*Strix occidentalis lucida*) on the forest (table BA-5). High levels of hiking and dispersed recreation use of Mexican spotted owl habitat areas may be detrimental to these birds but they are not likely threatened by an occasional hiker (Swarthout and Steidel 2001). Of the roads or trails occurring within the identified habitat, potential impacts would be limited to those associated with the increased access provided by these and adjacent roads and trails. Because of planned decommissioning or rehabilitation of roads and trails, all action alternatives would result in an overall reduction in the number of miles of roads and trails in potential Mexican spotted owl habitats.

Table BA-5. Miles of roads and trails within 2 miles of potential Mexican spotted owl habitat on the White River National Forest for all alternatives

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.58	0.58	0.51
Mechanized	0.29	0.29	0.29
Motorized/mechanized	0.87	0.87	0.80
Foot/horse	0.33	0.33	0.38
Total	1.20	1.20	1.18
Scheduled for decommission (reduction in density)	0.00	0.24	0.27

Approximately 130 square miles of potential habitat.

Alternative G would increase foot/horse use over Alternative A. Alternative G would reduce motorized use and both F and G and maintain existing levels of mechanized use. Alternative G would add approximately 6.58 miles of horse/foot use. F and G would reduce overall travelway densities over current, existing uses because of planned decommissioning and rehabilitation.

Winter

MSO habitat on the WRNF occurs within steep, rugged, inaccessible canyons. These areas are currently very inaccessible during the winter months to motorized uses. Limited non-motorized uses occur during the winter months, and that use is limited to the existing trail system. No direct or indirect impacts to MSO or MSO habitat is expected to occur under any of the alternatives.

Cumulative Effects

This draft environmental impact statement covers all National Forest System lands within the proclaimed boundary of the White River National Forest. As such, it does not cover any changes in the travel management options or other activities on private or state lands within the proclaimed national forest boundary.

No state lands occur within the general vicinity of the identified habitat for Mexican spotted owl on the White River National Forest (Glenwood Canyon and its tributary canyons). Therefore, no state actions are anticipated that would affect the Mexican spotted owl or its habitats.

Several parcels of private land occur within the confines of Glenwood Canyon. The largest of these is the Bair Ranch on the east end of the canyon. A conservation easement has been negotiated for this parcel. As this conservation easement is applied, the land will retain its undeveloped character and no activities that affect Mexican spotted owl are anticipated. No developments are anticipated on the other parcels of private land in the vicinity of potential Mexican spotted owl habitat.

Canada Lynx

Direct and Indirect Effects

The forest plan incorporates a substantial level of management direction associated with Canada lynx (*Lynx canadensis*) and lynx habitat. This direction was based in large part on the Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000). Extensive coordination meeting between the WRNF and the Fish and Wildlife Service resulted in the LCAS direction being modified for the local situations on the White River National Forest. This direction package received formal consultation as a part of the forest plan BA and BE. This direction promotes affirmative management actions to conserve lynx habitat conditions across the forest.

Summer

Summertime casual use of forest system roads by recreationists and other forest users has not been shown to be a significant issue for lynx (Ruediger et al. 2000). Concentrated human use areas and roads carrying traffic loads of more than 4,000 vehicles per day may deter lynx movements across the landscape. Interstate 70, Highway 82, Highway 9, and the highly developed areas around the communities associated with the forest all may affect lynx movements. There have been at least two lynx road kills on highways associated with the White River National Forest; both lynx (1999 and 2004) were killed within 1 mile of each other on Interstate 70 on the west side of Vail Pass. Two additional lynx were killed on Interstate 70 a few miles east of the White River National Forest boundary. Most other forest system roads do not carry vehicle loads approaching the level identified that affects summer lynx movements or deter lynx use of suitable habitats throughout the forest. Temporary displacement of some lynx individuals may occur because of vehicles and human uses but any displaced animals are expected to return to normal behavior patterns soon after disturbance is gone. The interiors of large blocks of denning habitat are generally secure from significant impacts of travel management because of high levels of downfall, which restricts human access including motorized vehicles and mechanized uses.

Several analyses were completed to assess how the different alternatives may impact lynx or lynx habitats across the forest. The number of miles of roads and trails by use type, by alternative was evaluated for the total forest (assuming that lynx may use all portions of the forest at some time, regardless of whether or not it is in one of the categories of lynx habitat)(table BA-6). A similar analysis was completed specifically for the categories of lynx habitat (1,153,000 acres)(table BA-7) and another similar analysis was completed for management areas considered important as movement linkage zones (MA 5.5 and regionally identified landscape linkages)(table BA-8).

Table BA-6. Travelway densities by alternative for the entire White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.56	0.56	0.50
Mechanized	0.20	0.20	0.16
Motorized/mechanized	0.76	0.76	0.66
Foot/horse	0.36	0.36	0.39
Total	1.13	1.13	1.05
Scheduled for decommission (reduction in density)	0.70	0.25	0.32

Approximately 3574 square miles of potential habitat were analyzed for this species based on the entire forest

Alternative F maintains the current authorized level of use for motorized, mechanized, and foot and horse access across the forest. Alternative G reduces both motorized (by 234 miles) and mechanized (143 miles) while increasing foot and horse access by 95 miles. Foot and horse recreational use has not been identified in the literature as being a significant issue to lynx use of habitat areas. Because of planned decommissioning of travelways, both F and G would result in fewer miles of roads and trails than under the current, existing situation.

Table BA-7. Travelway densities by alternative for lands within potential lynx habitat on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.49	0.49	0.44
Mechanized	0.21	0.21	0.19
Motorized/mechanized	0.70	0.70	0.63
Foot/horse	0.37	0.37	0.38
Total	1.06	1.07	1.00
Scheduled for decommission (reduction in density)	0.00	0.26	0.32

Approximately 1786 square miles of potential habitat were analyzed for this species.

Alternative F would slightly decrease the miles of mechanized use (approximately 1 mile) over alternative A and would increase foot/horse use by 3 miles across the Forest. Alternative G would reduce about 92 miles of motorized routes and about 34 miles of mechanized use while increasing foot and horse use by 16 miles. Because of planned decommissioning of travelways, all alternatives would result in fewer miles of roads and trails than under the current, existing situation.

Table BA-8. Travelway densities by alternative for lands within management areas considered important as movement linkage zones (management area 5.5 and regionally identified landscape linkages)

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	1.55	0.96	0.85
Mechanized	0.57	0.32	0.33
Motorized/mechanized	2.12	1.29	1.19
Foot/horse	0.58	0.16	0.11
Total	2.70	1.44	1.30
Scheduled for decommission (reduction in density)	0.00	0.40	0.47

Approximately 230 square miles of potential habitat were analyzed for this species.

Alternatives F and G both would provide less motorized, mechanized and foot/horse use than alternative A within the 5.5 and landscape linkage areas. Alternative F results in a reduction of almost one half and Alternative G is over one half. Because of planned decommissioning and rehabilitation of travelways, all action alternatives would result in fewer miles of roads and trails than under the current, existing situation.

All analyses indicate that any of the alternatives would result in reduced mileage of roads and trails over the existing situation because of rehabilitation of user-created roads and trails. This should result in a slight beneficial effect to lynx due to a reduction in the areas affected by motorized, mechanized, and foot/horse travel. The roads and trails being considered for removal do not carry the heavy traffic loads that have been identified as significant to lynx. Since general summer recreation use of forest roads is not identified as a risk factor for lynx, this reduction in potential harassment is not expected to result in a measurable effect on lynx or lynx habitat conditions across the forest

Winter

The primary concern for lynx from travel-management-related winter use of roads, trails, and routes is associated with snow compaction, because snow compaction can lead to increased access for other predators that compete with lynx for snowshoe hare and other prey species (Ruediger et al. 2000). The White River National Forest prepared a database of existing routes and play areas compacted in the winter. A subset of these existing routes and areas are “designated routes and play areas” from a lynx management standpoint. The term designated is defined as routes or areas that are authorized, managed, and promoted by the forest. This baseline map of designated compaction has been formalized through the U.S. Fish and Wildlife Service as a condition of the biological opinion in response to the BA prepared for the forest plan (USDI/FWS 2002). Most additions to the designated routes or play areas must be accompanied by a one-to-one reduction in the existing baseline within the same lynx analysis unit (USDA Forest Service/White River National Forest 2002a, Guideline 12).

For winter alternative A is equal to that of alternative F because the forest plan did, through standards and guidelines, dictate where motorized activity can occur. Note the decision to be made for winter is only for where motorized activity over snow can occur, as the forest is open to foot and other non-mechanized (wheeled) travel such as x-c, snowshoeing. (See Chapter 1 for purpose and need, and decisions to be made.)

The forest plan did not designate any specific routes or play areas however in the management area prescriptions that had over-snow restrictions to designated routes and

play areas for motorized travel. Therefore, alternative A and alternative F show no motorized routes or open play areas in the restricted management areas. These need to be designated in the action alternative. Alternative G for winter proposes for designation routes and play areas in the restricted areas.

Table BA-9. Designated winter travelway miles and play area acres by alternative for lynx habitat on the White River National Forest*

Type of use	Alternative A	Alternative F	Alternative G
Motorized Prohibited areas	526,372	526,372	526,372
Restricted -Motorized Routes	210,096	210,096	246,362
Open Motorized Areas	380,142	380,142	343,876

Includes approximately 1786 square miles of lynx habitat.

All alternatives maintain the same amount of motorized prohibited areas, while Alternative G reduces the amount of open motorized areas and increases the amount of the restricted motorized use areas. The decisions made under the travel management plan do not increase the "authorized, managed, and promoted" routes or play areas identified under the snow compaction map described above. None of the alternatives affect the designation shown on that map.

Recreation use of the forest during both summer and winter seasons has the potential of displacing lynx from preferred habitats. This harassment effect would be short-term and limited to the area adjacent to the activity. Displaced lynx are expected to return to favored habitats and normal behavior soon after the displacement activity is completed.

Cumulative Effects

This draft environmental impact statement covers all National Forest System lands within the proclaimed boundary of the White River National Forest. As such, it does not cover any changes in the travel management options or other activities on private lands within the proclaimed national forest boundary for either state or private lands. At the scale of this document, it is impossible to identify site-specific actions on either private or state lands that may affect listed species.

The majority of the state lands included with the proclaimed national forest boundary or immediately adjacent to the forest will continue to be managed very similarly to the current situation. Use is limited in scope and duration because most of these lands are either state parks that are managed to provide recreational opportunities for a wide range of users (Rifle Gap, Harvey Gap, and Sylvan Lake State Recreation Areas), or state wildlife management areas that are managed specifically for the benefit of wildlife and recreation (Christine, Toner Creek, Garfield Creek, Jenson, Coke Oven, and Radium State Wildlife Areas). No new major developments are expected to occur on these lands that will significantly affect lynx habitats.

Private lands within the proclaimed boundary are expected to continue to be developed as private home sites, housing developments, and commercial developments under county planning regulations. Many of these developments will take place within or adjacent to suitable lynx habitats. New home sites that are developed will generally have associated plowed roads that would result in increased winter use and compaction.

Penland Alpine Fen Mustard

Direct and Indirect Effects

The following information is addition to that found on pages 113 to 120 of the BA for the forest plan (USDA Forest Service/White River National Forest 2002b, appendix N). Penland alpine fen mustard (*Eutrema penlandii*) is a small alpine forb with thick, fleshy leaves and small white flowers; this plant exists at 12,300 to 13,100 feet. An ice-age relict, it is separated from its closest relative by about 1,000 miles (NatureServe 2005). Penland alpine fen mustard inhabits moss-covered peat fens subirrigated by melting upslope snowfields, occurring primarily on soils developed from a calcareous substrate (Center for Plant Conservation 2005).

Known threats to this species include mining and associated ditching activities, which disrupt the necessary hydrology upon which this species relies (Center for Plant Conservation 2005). Although these threats are not currently affecting the species on the White River National Forest, known populations are close to inactive mines and would be threatened if mineral extraction activities were to resume.

Recreational use also has been identified as a threat that may be increasing (NatureServe 2005). In this case the threat would include possible trampling by hikers moving off-trail. Any activity that directly or indirectly alters the surface or ground water supply and alters the wetland habitat required by this species could also pose a significant threat (NatureServe 2005).

This species occurs adjacent to the White River National Forest as a small population within the Hoosier Ridge Research Natural Area (RNA), which the White River shares with the Pike-San Isabel National Forests. Intensive surveys for this species were conducted within suitable habitats during the establishment of the Hoosier Ridge RNA. It is felt that these surveys were successful in identifying the majority of existing populations. The forest plan designated the area surrounding the White River portion of the Hoosier Ridge RNA as management area 1.31, which is backcountry recreation, non-motorized. This designation means that no roads would be built in the area and activities are geared toward the primitive; the area should have little evidence of recent human-caused disturbance. The RNA designation allows only low-level recreation activities and prohibits motorized vehicle travel. These designations offer some protection for the known population and make enforcement of travel restrictions and curtailment of undisciplined recreational use somewhat easier.

Direct or indirect impacts on Penland alpine fen mustard and its habitat by implementation of any of the alternatives would not be significant. None of the alternatives would result in any new construction of roads or trails on the forest. The population is within an established research natural area surrounded by a non-motorized management area prescription. Occurrences of accidental or unauthorized vehicle use should be very limited both summer and winter. Since the species is within the established Hoosier Ridge Research Natural Area, the population of Penland alpine fen mustard in the very small watershed above the White River National Forest is protected from vehicle use, grazing use, and road and trail construction. Since this watershed is protected, water quality critical to the species would not be changed or impaired.

BA-10. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

**Approximately 474 square miles of potential habitat were analyzed for this species.*

Within alpine habitats, alternative F does not change any travelways from alternative A. Alternative G reduces motorized use by about 3 miles, mechanized by 7 miles and foot/horse by 3 miles. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in alternative G when compared to the current, existing situation and alternative F. For the Penland alpine fen mustard, changes among alternatives in motorized or mechanized uses do not apply, because the currently identified, suitable habitat on the White River National Forest is within the Hoosier Ridge RNA. Because there are no current designated travelways within the RNA, no maintenance or decommissioning activities would occur. Additionally, no new construction is proposed with this analysis.

Cumulative Effects

Penland alpine fen mustard mostly occurs on federally administered lands within the Pike, San Isabel, and White River National Forests. Some populations occur on public lands managed by the Bureau of Land Management and some are on private lands. One of the largest populations is within the Hoosier Ridge Research Natural Area (the part of the RNA that is located on the Pike National Forest). The soils where this species occurs are fine-textured and relatively deep and loamy for alpine environs. Natural rehabilitation of alpine ecosystems is slow to very slow (Forbes et al. 2001). Any damage to the plants or their habitat requires decades for recovery. Repeated damage would be cumulative and result in degradation of the species and its habitat.

The Penland alpine fen mustard is partially protected by White River National Forest management area prescriptions that prohibit motorized and mechanized use. The population within the Hoosier Ridge Research Natural Area is more protected by restrictions on road or trail building. The White River National Forest population might come under increasing threats from unauthorized vehicle use, because recreational vehicle pressure is increasing in the surrounding area. On private lands, human population pressure and vehicle use will probably continue to increase in future years. The probability of damaging events from unauthorized vehicle use is increasing; the damage would be cumulative and likely lead to degradation of the populations and their habitat on unprotected lands.

Colorado Pikeminnow, Humpback Chub, Razorback Sucker, and Bonytail

Direct and Indirect Effects

Colorado Pikeminnow, Humpback Chub, Razorback Sucker, and Bonytail species all occur downstream of the White River National Forest in the Colorado, White, and Yampa rivers. The primary threat to these species from activities on the WRNF is water depletion. The proposed action will not change the amount of water used in road maintenance. Water used annually on the White River National Forest for dust abatement and road maintenance activities ranges from 1.3 to 2.2 acre-feet per year depending on budgets and the amount of planned activity. Water use is primarily on arterial and collector roads, which do not vary between alternatives. Specific records are not available, but it is estimated that use of this amount of water use has been relatively constant since about 1970, with water use on roads beginning around 1950. In general, water use is expected to be proportional to Forest Land distribution, with over 80% in the Upper Colorado drainage and less than 20% in the White River drainage. No water depletions are expected in the Yampa River basin due to the lack of major roads.

Cumulative Effects

This SDEIS covers all National Forest System lands within the proclaimed boundary of the White River National Forest. Water development on Private lands within the Forest Service boundary is expected to continue as inholdings are developed. Water use associated with these developments is expected to be minor residential use. There are no known proposals for changes in water use associated with reservoirs on State lands. There is currently a large proposal to develop water for use on the Front Range in the Eagle River. It is not known at this time when, where, and if this project will be developed.

Greenback Cutthroat Trout

Direct and Indirect Effects

Recent improvements in genetic analysis techniques appear to have made it possible to differentiate Colorado River cutthroat trout from greenback cutthroat trout. Although this differentiation is still considered somewhat preliminary, it is considered best available science and therefore populations identified as “GBlineage” are considered greenback cutthroat trout. The WRNF has five populations to date which have been identified as GBlineage: Three Licks Creek, Frey Gulch, Cunningham Creek, Park Creek, and Cache Creek. Genetic results received in 2007 and 2008 from collections processed at Pisces Molecular using AFLP procedures are presented in Table F. These results have not been confirmed with a complementary genetic analysis (e.g., mitochondrial DNA).

Table BA-11. Genetic results from GBlineage cutthroat trout populations on the White River National Forest

Population	N	Greenback	Colorado River	Rio Grande	Yellowstone
Three Licks	25	86%	12%	trace	1%
Frey Gulch	25	98%	1%	trace	none
Cunningham	40	100%	none	none	none
Park	27	93%	3%	trace	3%
Cache	30	91%	7%	trace	2%

"N" is the number of fish sampled.

Twenty-five miles of roads are removed from the GBlineage watersheds in alternative G and seven are removed in alternative F. Some are converted to motorized trails and others are scheduled for decommissioning. Four of these watersheds would have roads decommissioned within the occupied part of the watershed. The fifth (Cache Creek) also has a trail along the creek which would be removed from the system (allowed to revegetate). There may be shortterm negative impacts to these populations from decommissioning activity, however, the long-term effect would be beneficial as watershed function improves and road-derived sediment is reduced. Alternative G decommissions and rehabilitates more roads than alternative F, but both offer a long-term benefit over the alternative A-no action alternative.

Table BA-12. Comparison of roads and motorized trails in each alternative in watersheds containing a cutthroat trout population believed to be greenback cutthroat trout

Population (watershed)	Three Licks (Big Hole Creek)	Frey Gulch (Frey Gulch)	Cunningham (North Fork Fryingpan)	Park Creek (North Thompson)	Cache Creek (Cache Creek)
NA – roads	3.73	5.37	30.97	28.41	0.36
NA – trails	0	1.42	0	0	0
F – roads	3.73	5.37	30.97	21.39	0.36
F – trails	0	1.42	0	0	0
G – roads	1.24	1.03	19.87	20.76	0.36
G – trails	2.11	5.57	8.98	0	0

The subwatershed or catchment containing the population used for analysis is in parenthesis below the population name.

Cumulative Effects

With the exception of Cunningham Creek and Frey Gulch, the lower distributions of these populations are not known, therefore for this cumulative effects discussion, it is assumed that the entire stream is occupied in Three Licks, Park, and Cache creeks. Frey Gulch, Park Creek, and Cunningham Creek occur entirely on the White River National Forest with no private inholdings. The lower approximately onehalf mile of Three Licks Creek is on private land. The Cache Creek population occurs primarily downstream of the forest on private and BLM lands. There are no state lands along any of these occupied streams. Private lands on Three Licks Creek are currently used as a ranch with grazing and this use is expected to continue. It is possible this land could be developed into ranchettes. Extensive natural gas development is occurring in the region which includes Cache Creek. It is expected that natural gas development will occur on the private land in the Cache Creek watershed potentially impacting this population.

Determinations of Effects and Rationale

Uncompahgre Fritillary Butterfly—All Alternatives

There would be no new construction of travelways in Uncompahgre fritillary butterfly habitat on the White River National Forest under any of the alternatives. Only limited increases in human use of Uncompahgre fritillary butterfly habitats are anticipated due to overall increased human use of the forest. Overall mileage of roads and trails open to human uses on the White River National Forest would decrease in comparison to the existing situation under Alternatives F and G. No impacts to Uncompahgre fritillary butterfly habitats are expected due the proposed action or any alternative identified for this project. There is no information in the available literature that indicates that general recreation use of existing roads and trails is a risk factor for this species. The forest plan has specific direction to protect Uncompahgre fritillary butterfly habitat and populations from adverse actions. Therefore, there will be **NO EFFECT** to Uncompahgre fritillary butterfly or its habitats, by any of the alternatives under consideration in this DEIS.

Mexican Spotted Owl—All Alternatives

There would be no new construction of travelways in potential MSO habitat under any of the alternatives. The increase in recreation use of the forest in the vicinity of spotted owl habitat is expected to be negligible and due to general increase in human uses on existing trails within a 2-mile radius of potential Mexican spotted owl habitat. All alternatives would result in a reduction in the overall miles of open roads and trails over the existing situation. The literature does not indicate that general recreation use is a risk factor for Mexican spotted owl. Therefore, there will be **NO EFFECT** to Mexican spotted owl or its habitats, by any of the alternatives under consideration in this draft environmental impact statement.

Canada Lynx—All Alternatives

The number of miles of roads and trails would be reduced across the entire forest, over the portion of the forest that is lynx habitat, and for the areas within management area prescription 5.5 and regional linkages from the current situation, under all alternatives. This reduction in mileage would result in less summer motorized and mechanized harassment potential across each of the areas analyzed. Foot and horse traffic is not generally restricted anywhere on the forest; however, most of those uses are contained on established trail systems. The reduction in mileage for these trail systems would generally reduce access, with a consequent potential reduction in harassment of lynx over the current situation. Winter designated routes and play areas do not change under each alternative over the current winter use on the forest. Lynx habitat would not be significantly affected by any of the actions proposed under any alternatives. The overall result for all alternatives when considering summer and winter uses is that there should be a slight beneficial effect from the reduction in the mileage of roads and trails open to use across the forest. This reduction should result in a slight reduction in potential harassment of lynx due to human use of the forest. This beneficial effect is anticipated to be too slight to be measurable at the scale of the forest. No cumulative impacts have been identified on private or state lands that are expected to change lynx habitats or affect lynx on the White River National Forest. Any potential impacts from this action are considered to be insignificant due to the fact that there will be an overall reduction in road and trail miles, and discountable due to the fact that no lynx are expected to be directly or indirectly affected by this action. Overall, the determination for lynx is **MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT.**

Penland Alpine Fen Mustard—All Alternatives

No new construction of roads or trails in the Penland alpine fen mustard habitat would be added to the White River National Forest transportation system under any of the alternatives in this draft environmental impact statement. Human use of this species' habitat is expected to be limited because of the protection afforded by research natural area designation and management area prescription. Overall, mileage of roads open to human uses on the White River National Forest would decrease in comparison to the existing situation under all alternatives. Trail mileage will increase under both of the action alternatives, but the majority of the increase is in non-motorized use. None of the increase in use will occur within the RNA or fen mustard habitats. The BA for the revised forest plan described the ineffectiveness of current barriers to motorized and mechanical travel for access to this species' habitat; this is a law enforcement issue, outside the scope of the travel management plan. As mentioned in the BA, the ineffectiveness of the barriers could be resolved by signing a closure order and building better, more competent barriers. Under the assumption that compliance with travel restrictions and prohibitions will occur, the determination for Penland alpine fen mustard is **MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT.** Any impacts will be insignificant due to the lack of roads and trails within suitable habitat for this species, and discountable due to the protections under the RNA designation.

Colorado Pikeminnow, Humpback Chub, Razorback Sucker, and Bonytail—All Alternatives

The historic water depletion associated with road maintenance is expected to continue with all alternatives. Approximately 1.3 to 2.2 acre-feet of water will be depleted per year from the White and Upper Colorado rivers. As stated in the December 1999 Biological Opinion: Providing adequate flows in the 15 Mile Reach, downstream of the project area, in combination with other recovery actions, has been identified as important to achieving recovery of these species. The water depletion associated with this project is small, yet is counter to these recovery efforts. Therefore, the determination for Colorado pikeminnow, humpback chub, razorback sucker, and bonytail is **MAY AFFECT, LIKELY TO ADVERSELY AFFECT.**

Greenback Cutthroat trout – All Alternatives

For all occupied watersheds, roads and trails are removed and/or the level of use is reduced (e.g., from a road to a motorized or non-motorized trail) in alternative G. In alternative F, roads are removed only from the North Thompson watershed (Park Creek population). Reducing the road and trail networks in these watersheds would have long-term benefits to greenback cutthroat trout as road-derived sediment and other road-related impacts are reduced. There may be a short-term increase in disturbance and sediment inputs into occupied habitat during decommissioning activities, however, these impacts are likely to be insignificant. Therefore, the determination for greenback cutthroat trout is **MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT.**

APPENDIX B: BIOLOGICAL EVALUATION

Introduction

This biological evaluation (BE) addresses the potential impacts of the White River National Forest Travel Management Plan (TMP) on Forest Service Rocky Mountain Region (R2) sensitive species that occur or have the potential to occur on the White River National Forest. This document supplements the biological evaluation (BE) produced for the White River National Forest Land and Resource Management Plan (Forest Plan) (USDA Forest Service/White River National Forest 2002a). The list of regional-forester-approved sensitive species was updated on November 3, 2003 and April 30, 2007. These updates incorporated many changes to the 1994 list. For the species that remained on the 2006 list, most of the information contained in the forest plan is considered accurate and appropriate for this Travel Management Draft Environmental Impact Statement BE. This document tiers to the forest plan BE. Information included in the forest plan BE is not repeated here except for clarification purposes. This document adds information for those species included on the updated list that were not included on the 1994 list. The purpose of this BE is to document the likely effects on Forest Service listed sensitive species from the forest-wide travel management plan proposed action. The action area for this BE are lands within the White River National Forest boundary. Decisions based on this document would pertain to National Forest System lands; lands under other ownerships would not be affected by the proposed action or other alternatives and are not discussed further.

The BE is evaluated based on the projects' purpose and need and alternatives. The assumptions are the same as stated in the BA. Note the term decommissioning also includes system routes to be decommissioned and/or user-created routes to be rehabilitated.

Species Considered and Species Evaluated

Table BE-1 displays the species from the 2007 R2 sensitive species list that are known or suspected to occur on the White River National Forest and their primary habitat associations.

Table BE-1. Habitat associations for sensitive species evaluated in the White River travel management plan

Species	Habitat Classification				
	Mixed mountain shrub	Forest	Mountain grass or forb	Riparian	Alpine
Mammals					
Townsend's big-eared bat	P	P	P	P	
Spotted bat	P	P	P		
Wolverine	P	P	P	P	P
River otter*				P	
American marten		P		P	S
Fringed myotis*	P	P			

Species	Habitat Classification				
	Mixed mountain shrub	Forest	Mountain grass or forb	Riparian	Alpine
Birds					
Northern goshawk	S	P	S	P	
Boreal owl		P			
Sage sparrow*	P				
Ferruginous hawk			P		
Greater sage grouse*	P				
Northern harrier*	S		P	S	
Olive-sided flycatcher		P			
Black swift				P	
American peregrine falcon*	S	P	P	P	S
White-tailed ptarmigan*				S	P
Bald Eagle	S			P	
Loggerhead shrike	P		P		
Lewis' woodpecker				P	
Flammulated owl		P			
American 3-toed woodpecker		P			
Purple martin	S	P	S		
Brewer's sparrow*	P				
Columbian sharp-tailed grouse*	P		S	S	
Amphibians					
Boreal toad				P	
Northern leopard frog				P	
Fish					
Colorado River cutthroat trout				P	
Roundtail chub*				P	
Bluehead sucker*				P	
Flannelmouth sucker*				P	
Mountain sucker*				P	
Invertebrates					
Great Basin silverspot*				P	
Plants					
*Carex diandra**				P	
Eriophorum altaicum				P	
Cypripedium parviflorum		P			
*Eriophorum chamissonis**				P	
*Eriophorum gracile**				P	
Ptilagrostis porteri					P
Armeria maritima					P
*Astragalus leptaleus**					P
*Astragalus wetherillii**	P				

Species	Habitat Classification				
	Mixed mountain shrub	Forest	Mountain grass or forb	Riparian	Alpine
*Cirsium perplexans**	P				
*Draba exunguiculata**					P
*Draba grayana**					P
Ipomopsis globularis					P
Machaeranthera coloradoensis			P		P
Parnassia kotzebuei				P	
Penstemon harringtonii	P				
Phacelia scopulina	P				
*Ranunculus karelinii**				P	
*Thalictrum heliophilum**	P				

P= Primary habitat

S= Secondary habitat

**= Species not included in the BE for the forest plan, June, 2002.*

Environmental Baseline for the Species Evaluated

Most of the activities that affected the White River National Forest occurred prior to the issuance of the Forest Plan and were described in the BA/BE for that document. Some additional development for natural gas has occurred on the western portion of the forest; however, other activities have been minor and have not changed the basic appearance or function of the forest. Since the approval of the forest plan, several areas of the forest have seen wide-spread beetle epidemics that have affected large areas of forested stands in both spruce and lodgepole pine. These epidemics currently are centered around the Fourmile Creek/Baylor Park area, Vail, Triangle Park, and Summit County.

Evaluated Species Information

Basic life history information for sensitive species included in the BE for the forest plan was based on the 1994 regional forester list of sensitive species. The species retained from the 1994 list that are on the 2007 updated list of the R2 sensitive species are described in detail in the BE prepared for the forest plan. This document adds information for the species new to the 2007 list. The spatial scale of the proposed action covers all portions of the forest. Therefore, all sensitive species known or suspected to have habitat on the White River National Forest are evaluated in this document.

Mammals

North American Wolverine

The North American wolverine *(gulo gulo luscus)* is discussed in the BE for the forest plan; life history and other general information can be found in that BE (USDA Forest Service/White River National Forest 2002a). This species is susceptible to disturbance from human use of its habitat, especially during the maternity denning period. Winter recreation use in the general vicinity of a female with young has caused the female to move her young up to 6 miles in one Idaho study (Copeland 1996). Most researchers indicate that wolverines need large areas undisturbed by human intrusion to be the most successful in maintaining populations. One of the three major risk factors identified for

this species is disturbance to individuals through human interaction (USDA Forest Service/White River National Forest 2002b). Travel management has the potential to affect wolverine through human disturbances.

Short of specific information concerning wolverine habitat management needs, management aimed at maintaining lynx in an area will also serve to maintain conditions suitable for wolverine. The White River National Forest incorporated a wide range of lynx management direction into the forest plan that will also benefit the wolverine. This direction includes goals, objectives, strategies, standards, guidelines, and specific management area direction, all geared at maintaining and improving lynx habitats and populations. Much of these direction items guide travel management either directly or indirectly.

Summer

Table BE-3. Wolverine habitat forest-wide analysis of roads and trails, by use type, by alternative

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.56	0.56	0.50
Mechanized	0.20	0.20	0.16
Motorized/mechanized	0.76	0.76	0.66
Foot/horse	0.36	0.36	0.39
Total	1.13	1.13	1.05
Scheduled for decommission (reduction in density)	0.00	0.25	0.32

**Approximately 3574 square miles of potential habitat were analyzed for this species.*

Alternative F maintains the current authorized level of use for motorized, mechanized, and foot and horse access across the forest. Alternative G reduces both motorized (by 234 miles) and mechanized (143 miles) while increasing foot and horse access by 95 miles. Because of planned decommissioning and rehabilitation of travelways, both F and G would result in fewer miles of roads and trails than under the current, existing situation.

Winter

Wolverines have expansive home ranges that cover a variety of habitats. The most critical time is late winter for females with young. During this time, females appear to be very sensitive to human intrusions into their habitats and may take drastic measures to move their young from areas used by humans (USDA Forest Service/White River National Forest, 2002a). None of the alternatives vary in the overall total areas that are considered practical for motorized or non-motorized use across the forest. Approximately 288,000 acres (13 percent) of the forest is practical for access during the winter (slopes less than 30 percent and canopy cover less than 40 percent). More than 87 percent of the forest would remain relatively “human-free” during the winter months under all alternatives.

New, expanded technology and uses have the potential to change the level of protection that steep, inaccessible terrain currently provides across the forest. Specifically, access by helicopter, snowmobile, or snowcoach for skiing or other forms of winter recreation uses has the potential to jeopardize areas currently considered secure from these human impacts. Proposed projects promoting these types of uses will be carefully reviewed under the BE process for potential impacts on wolverine prior to being approved.

Determination

There would be no direct habitat changes to potential wolverine habitat through implementation of the proposed action under any alternative. The implementation of the lynx direction across the forest will provide for the general protection and enhancement of wolverine habitat including issues specific to travel management during the summer months. None of the alternatives vary in the overall practical access to the forest during the winter months. All alternatives have the potential to allow human access into some areas that may be critical to females with young. This access and subsequent disturbance has the potential to displace females with young. Considering that more than 87 percent of the White River National Forest would remain relatively human-free during most winters (including most of the higher elevations that are preferred by nursing females), there should be adequate secure areas to provide for the needs for any breeding female wolverine displaced by human activity in the portions of the forest with access. The determination for wolverine for all alternatives is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

American Marten

The American marten (*Martes americana)* is covered in the BE for the forest plan; life history and other general information can be found in that BE (USDA Forest Service/White River National Forest 2002a). The marten is an interior forest species highly dependent on mesic, late-successional forests with complex physical structure on or near the ground (USDA Forest Service/White River National Forest 2002b). The primary risk factor for this species associated with NFS management is vegetation management, specifically timber sales that affect late successional forest stands. Increased road mileage is a potential risk factor when it leads to an increased potential for trapping pressure. Trapping for martens is no longer legal in the state of Colorado, so this risk factor and its tie to road mileage is no longer appropriate for consideration. The proposed action under any of the alternatives of this draft environmental impact statement would not affect the quantity or quality of late successional stands across the White River National Forest. No new road or trail construction is proposed. Neither summer nor winter disturbance impacts from general recreation use of an area are identified in the literature as an important risk factor for martens.

Summer

Changes in the amount and type of use of roads and trails within the forested lands on the White River National Forest were evaluated to assess the level of changes that may occur depending on the alternative (table BE-4).

Table BE-4. Travelway densities by alternative for lands within the forested habitats for American marten on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.47	0.47	0.42
Mechanized	0.20	0.20	0.17
Motorized/mechanized	0.67	0.66	0.58
Foot/horse	0.35	0.35	0.36
Total	1.01	1.01	0.95
Scheduled for decommission (reduction in density)	0.00	0.00	0.25

Approximately 2226 square miles of potential habitat were analyzed for this species.

Within forested American marten habitats, alternative F decreases mechanized access by approximately 5 miles forest-wide, while increasing foot/horse use by 4 miles. Alternative G decreases motorized travelways by 110 miles and mechanized by 69 miles. This alternative increases foot/horse by 39 miles. Planned decommissioning of travelways would reduce open travelway density in all the alternatives when compared to the current, existing situation.

Winter

An analysis was completed for habitats that could possibly support marten populations on the White River National Forest. This analysis originally identified forested lands that serve as snowshoe hare habitat but these same lands would also serve as a good comparison of marten habitats (table BE-4W). Winter open motorized uses would be decreased slightly under alternative G, while F remains similar to Alternative A.

Table BE-4W. Designated winter travelway miles and play area acres by alternative for marten habitat on the White River National Forest

Type of use	Alternative A	Alternative F	Alternative G
Motorized Prohibited areas	526,372	526,372	526,372
Restricted -Motorized Routes	210,096	210,096	246,362
Open Motorized Areas	380,142	380,142	343,876

Includes approximately 1786 square miles of marten habitat.

Normal recreation use has not been identified as a risk factor for the American marten from either motorized or non-motorized uses during either summer or winter. There is a potential for individual martens to be killed while crossing roads throughout the forest. This potential is expected to remain the same regardless of the alternative, and it may be slightly less than under the existing situation because of the decommissioning of many unauthorized roads and trails under all alternatives. No other impacts on martens are expected to occur from the proposed action or any of the alternatives. The determination for all alternatives is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

River Otter

The river otter (*Lontra canadensis)* was not covered under the BE for the forest plan.

The river otter mainly inhabits large river systems in riparian habitats that traverse a variety of other ecosystems ranging from semi-desert shrublands to montane and subalpine forests. The otter requires permanent water of relatively high quality and with an abundant food base of fish or crustaceans. Overhanging vegetation is essential for otter habitat. Other habitat features that may be important include the presence of ice-free reaches of stream in winter, water depth, stream width, and suitable access to shoreline. Dens usually are holes in the bank or abandoned beaver lodges with the entrance under water. Basking sites are stream banks. Otters do not hibernate, and they mate in the winter or early spring, probably March and April in Colorado. Total gestation has been estimated at 290 to 375 days; young are born in April and May. The river otter once lived in most of the major drainages of Colorado and was subsequently extirpated. Starting in 1976, Colorado initiated restoration efforts in several drainages; transplants have now been made in several rivers. An historical occurrence of river otters was documented in Rio Blanco County on the White River (Barrett and Overly 1992, Fitzgerald et al. 1994). In 2003, an avid local fisherman reported an otter sighting on the South Fork of the White River, and otters were reported along the Eagle River at Avon in the late 1990s. Anecdotal records also report otters along the Colorado River near Glenwood Springs and on Main Elk Creek, just below the forest boundary, in Garfield County.

The analysis for otter included all lands within one-half mile of the major river systems associated with the forest (table BE-5).

Table BE-5. Travelway densities by alternative for lands within potential river otter habitat on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	1.17	1.17	1.14
Mechanized	0.20	0.20	0.24
Motorized/mechanized	1.36	1.36	1.39
Foot/horse	0.44	0.44	0.40
Total	1.80	1.80	1.79
Scheduled for decommission (reduction in density)	0.00	0.37	0.28

Approximately 54 square miles of potential habitat were analyzed for this species.

Authorized uses in alternative F are similar to alternative A. Alternative G reduces motorized by 1 mile, increases mechanized by1.5 miles and decreases foot/horse by 2 miles. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in alternatives F and G when compared to the current, existing situation.

The forest plan and other agency direction include significant protection for riparian areas, which would be the primary habitat for river otter on the White River National Forest. This direction includes watershed conservation practices (WCP) direction, riparian protection standards and guidelines for grazing (USDA Forest Service/White River National Forest 2002a, page 2-11), and standards for protection of sensitive species and their habitats (USDA Forest Service/White River National Forest 2002a, page 2-19).

Winter

An analysis of winter use in potential river otter habitat indicates that authorized uses under alternative F are similar to alternative A. In alternative G, open motorized use in potential river otter habitat would be reduced by 70% while restricted motorized use would increase by 37%.

Determination

The riparian protection direction coupled with the lack of direct habitat alterations under the proposed action, the overall reduction in road and trail densities over the existing situation, and the low likelihood of river otters currently residing on the forest all indicate a low likelihood of detrimental impacts on this species under any of the alternatives. There is a slight chance that individual otters using suitable habitats on the forest may be killed while attempting to cross existing roads adjacent to the larger river systems on the forest or may be harassed by anglers or river floaters. For these reasons, the determination for all alternatives is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

Fringed Myotis, Spotted Bat, and Townsend's Big-eared Bat

Fringed Myotis

The fringed myotis (*Myotis thysanodes)* was not covered by the BE for the forest plan. The fringed myotis apparently is not common in Colorado and is found in ponderosa pine, pinyon-juniper woodlands, greasewood, oakbrush, and saltbush shrublands up to 7,500 feet. These bats begin to forage shortly after sunset, although most of their activity occurs a couple of hours after dark. Foraging occurs along lake edges, creek bottoms, and over intermittent streams (Schmidt 2003). These bats are gleaners and they forage close to the plant canopy, where they pick prey off the vegetation during a slow, maneuverable flight. The fringed myotis has a relatively broad diet, feeding on moths, beetles, caddis flies, ants, bees, wasps, and other insects. Females mate in the fall; ovulation and fertilization occur in late April and May. The gestation period is 50 to 60 days and they have one young per year. Caves, mines, and buildings are used as both day and night roosts. Localized migrations are thought to occur but firm data are lacking. Hibernation sites include caves and buildings from November to March. The few records of this species from Colorado are widely scattered both east and west of the Continental Divide habitat (Barrett and Overly 1992, CDOW 1984, Fitzgerald et al. 1994). It occurs in Rio Blanco, Garfield, and Mesa counties (Ellison et al. 2003).

Very little information is available concerning fringed myotis populations on the White River National Forest. Based on the lack of information, it is assumed that they may occur where suitable habitat is found. This would include those areas of the forest supporting pinyon-juniper or shrublands associated with karst topography.

Townsend's big-eared bat and spotted bat

The Townsend's big-eared bat (*Corynorhinus townsendii*) and the spotted bat (*Euderma maculatum*) are discussed in detail in the BA for the forest plan (USDA Forest Service/WRNF 2002a); that document provides more information about those species on the White River National Forest.

All three species

Summer

A combination of analyses were compared to evaluate potential impacts on these bat species from implementation of the travel management plan. These included looking at potential impacts on pinyon-juniper habitats, shrubland habitats, and karst topography, all of which include potential habitat areas for these species. However, the habitats probably cover a much broader geographic area than is occupied by these bats on the White River National Forest. By reviewing the results of all three analyses (tables BE-6, BE-7, and BE-8), one can judge the overall potential for impacts to these species.

All three species

Table BE-6. Travelway densities by alternative for lands within potential bat habitat within pinyon-juniper stands on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.33	0.33	0.27
Mechanized	0.08	0.08	0.05
Motorized/mechanized	0.41	0.41	0.31
Foot/horse	0.03	0.03	0.09
Total	0.44	0.44	0.40
Scheduled for decommission (reduction in density)	0.00	0.04	0.07

Approximately 32 square miles of potential habitat were analyzed for this species.

For pinyon-juniper communities that could possibly support these three species of bat populations, Alternatives A and F provide similar authorized opportunities. Alternative G is the only alternative that would add foot/horse travelways (a total of approximately 23 miles). Alternative G would reduce motorized (by 102 miles) and mechanized travel (50 miles). Planned decommissioning of travelways would reduce open travelway density in alternatives F and G when compared to the current, existing situation.

Table BE-7. Travelway densities by alternative for lands within potential bat habitats within shrubland habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.99	0.99	0.85
Mechanized	0.27	0.27	0.18
Motorized/mechanized	1.26	1.26	1.03
Foot/horse	0.33	0.33	0.41
Total	1.59	1.59	1.44
Scheduled for decommission (reduction in density)	0.00	0.33	0.44

Approximately 434 square miles of potential habitat were analyzed for this species.

For authorized uses within shrubland communities that may support these three species of bat populations, alternative F and A are identical. Alternative G reduces motorized and mechanized road and trail density, and increases foot and horse density over alternative A. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in all the alternatives.

Table BE-8. Travelway densities by alternative for lands within 2 miles of karst topography that may provide cave dwelling bat habitat on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.69	0.69	0.58
Mechanized	0.22	0.22	0.17
Motorized/mechanized	0.91	0.91	0.75
Foot/horse	0.34	0.34	0.37
Total	1.26	1.26	1.12
Scheduled for decommission (reduction in density)	0.00	0.28	0.40

Approximately 954 square miles of potential habitat were analyzed for this species.

For cave bats, alternatives A and F are similar. Alternative G reduces motorized and mechanized route density, but does slightly increase foot and horse density. Compared to the existing condition, alternatives F and G would result in reduced road and trail densities across the forest because of road and trail decommissioning.

The analyses documented above all cover a much broader range of the White River National Forest than is likely to be inhabited by any of the three species of bats; therefore, this analysis should be considered broad when considering potential impacts. Regardless, all analyses indicate that alternatives F and G would have a positive effect over the existing situation because of road decommissioning. Motorized uses would be the least under alternative G; this alternative should result in the least overall potential impact on the bat species from recreational access to any caves used by any of the three species.

The forest plan contains direction that results in additional protection for cave resources above those that existed prior to the revision effort. This direction includes:

Cave standards 1, 2, and3 (USDA Forest Service/White River National Forest 2002a, page 2-3):

Cave standard 1—"Manage natural surface drainage and vegetation that may affect known caves or cave resources to protect cave micro-environments."

Cave standard 2—"Management activities that may affect known caves will be designed to protect cave ecosystems."

Cave standard 3—"Identified significant caves will be withdrawn from mineral entry;" and

Wildlife standards 2 and 3 (USDA Forest Service/White River National Forest 2002a, page 2-17):

Wildlife standard 2—"Restrict actions within 500 feet of cave and mine bat roosts to those that will not negatively alter the vegetative and structural characteristics of roosts or impede the movements of bats."

Wildlife standard 3—"Restrict the release of the location of bat roosts to administrative purposes only in order to minimize disturbance to roosting bats."

Winter

Winter, open motorized uses would be reduced in alternative G over the existing situation or alternative F. Acres of winter restricted use is higher in G than in A or F. Reduced winter use should reduce potential disturbance impacts to hibernating cave bats under all alternatives (Kirk Navo, [CDOW] pers. comm.).

Determination

Forest plan direction will help reduce potential impacts on this species from human recreation use; however, there is a continued potential of human access to areas considered important to these species. This human use may result in some level of disturbance to roosting individuals or populations. The determination for the proposed action under all alternatives for all three species of bats considered is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

Pygmy Shrew

The pygmy shrew (*Microsorex hoyi montanus)* was covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). This species is able to survive in a variety of habitats across the forest. Identified risk factors include: harvest activities where overhead cover and forest floor vegetation are disturbed; construction of forest roads; and development of recreation facilities and ski areas. Grazing by herbivores may alter shrew habitats. This species has not been documented to occur on the White River National Forest but has been found both north and south of the forest.

An analysis of the forest-wide total miles of roads and trails open to the various use types was completed for this species (table BE-9).

Table BE-9. Pygmy shrew forest-wide analysis of roads and trails, by use type, by alternative

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.56	0.56	0.50
Mechanized	0.20	0.20	0.16
Motorized/mechanized	0.76	0.76	0.66
Foot/horse	0.36	0.36	0.39
Total	1.13	1.13	1.05
Scheduled for decommission (reduction in density)	0.00	0.25	0.32

Approximately 3574 square miles of potential habitat were analyzed for this species.

Alternative F maintains the current authorized level of use for motorized, mechanized, and foot and horse access across the forest. Alternative G reduces both motorized (by 234 miles) and mechanized (143 miles) while increasing foot and horse access by 95 miles. Because of planned decommissioning and rehabilitation of travelways, both F and G would result in fewer miles of roads and trails than under the current, existing situation.

Determination

Based on the wide range of habitats inhabited by this species and on the fact that no new construction of roads or trails is proposed, it is doubtful that there would be any direct impacts to the habitat of this species from implementing any of the alternatives. Small ground-dwelling species with small home ranges, such as shrews, do have the potential to be killed by vehicles using forest roads and trails. Decommissioning of travelways across the forest would reduce densities for all alternatives over the current, existing situation; road decommissioning would reduce the potential for road kills. The lack of direct habitat impacts, the wide range of habitats used by this species, and the potential for occasional road kills from vehicle use of forest travelways leads to the determination for this species for all alternatives being **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

Bighorn Sheep

The Rocky Mountain bighorn sheep was not listed as a sensitive species by Region 2 when the 2005 DEIS was released. Therefore, potential impacts to this species were not analyzed at that time. In April, 2007, it was included on the revised R2 sensitive species list. The White River National Forest provides important suitable habitat for several herds of bighorn sheep across the forest. Several of these herds are considered endemic herds and have not been supplemented by transplants from other herds or areas. Other herds on the forest are either partially or totally the result of transplants. Bighorn sheep were at one time considered by many to be the most common big game animal in the mountains of Colorado. A species conservation assessment (SCA) for this species was completed in February 2007. The reader is referred to that document for detailed life history information. Much of the following information comes from the SCA .

"Threats to the long-term viability of bighorn sheep in Region 2 include diseases transmitted by domestic livestock, the lack of connectivity and/or loss of genetic variability (fitness) due to habitat fragmentation, habitat loss, increased human disturbance, competition with domestic livestock, and predation on small, isolated herds. The relative importance of these threats to the persistence of bighorn sheep in Region 2 varies from area to area. However, the risk of disease outbreaks resulting from contact with domestic sheep and goats is widely believed to be the most significant threat facing bighorns in Region 2 and elsewhere across their range." (Beecham et al 2007, page 4).

One of the eight recommendations in the SCA is to protect bighorn from harassment and human disturbance, especially during winter and lambing seasons. The potential impacts from travel management decisions are analyzed in this document.

"Bighorn sheep behavior patterns are extremely rigid and ritualized and play an important role in population persistence (Geist 1971). Studies suggest that bighorns do not adjust well to perturbations in these behavioral patterns (Geist 1971, Krausman 1993, Krausman et al. 1995). Consequently, human disturbance may be a factor disrupting bighorn behaviors and movements and may contribute to population declines." (Beecham 2007, page 31).

"Wild sheep have habituated to human activity in many areas where the activity is somewhat predictable temporally and spatially. However, human disturbance (e.g., snowmobiling and heli-skiing on and near winter ranges) and human presence near lambing sites may be detrimental to bighorns in some locales (Graham 1980, MacArthur

et al. 1982, Etchberger et al. 1989). Mineral exploration and extraction, road construction, harassment by low flying aircraft, and other human disturbances near lambing grounds had potential detrimental effects on Dall sheep populations (Nichols 1975, Hoefs and Barichello 1985, Poole and Graf 1985). Human development, especially in valley areas, may function to limit bighorn movements between mountain ranges occupied by bighorn sheep and become a critical factor in determining their long-term conservation prospects. In Region 2, human disturbance to bighorns occurs primarily on their winter ranges as a result of winter recreational activities, development projects at lower elevations (Linstrom 2005b; see also discussion on Waterton Canyon herd), and the presence of high traffic roads through areas used by sheep. At this point, the effects of human disturbance on bighorn sheep appear to vary considerably among areas, and managers should consider this treat on a case-by-case basis." (Beecham 2007, page 37-38).

Two analyses were completed to display the potential impacts of the travel management plan alternatives on bighorn sheep. The first analyzed the road and trail densities on all habitat identified by the CDOW as bighorn sheep range on the White River National Forest (table BE-10). The second analyzed the road and trail densities on those portions of the White River National Forest designated as Management Area 5.42, Bighorn Sheep Habitat, in the Forest Plan (Table BE-11).

Table BE-10. Forest-wide bighorn sheep overall range analysis of roads and trails, by use type, by alternative

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.37	0.37	0.26
Mechanized	0.10	0.10	0.04
Motorized/mechanized	0.47	0.47	0.29
Foot/horse	0.46	0.46	0.50
Total	0.93	0.93	0.79
Scheduled for decommission (reduction in density)	0.00	0.13	0.26

Approximately 863 square miles of potential habitat were analyzed for this species.

Table BE-11. Bighorn sheep analysis of roads and trails, by use type, by alternative, in Management Areas 5.42

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.07	0.07	0.06
Mechanized	0.02	0.02	0.02
Motorized/mechanized	0.08	0.08	0.08
Foot/horse	0.47	0.47	0.47
Total	0.55	0.55	0.55
Scheduled for decommission (reduction in density)	0.00	0.08	0.07

**Approximately 264 square miles of potential habitat were analyzed for this species.*

Authorized uses under Alternatives A and F are identical. Alternative G slightly reduces motorized routes, but mechanized and foot/horse route density remains the same. Because of planned decommissioning and rehabilitation of travelways, both F and G would result in fewer miles of roads and trails than under the current, existing situation.

Determination

Normal recreation use has not been identified as a risk factor for bighorn sheep from either motorized or non-motorized uses during either summer or winter. Some displacement can occur in areas of high public use, but bighorns are known to be fairly adaptive of human disturbances. There is a potential for individual sheep to be killed while crossing roads throughout the forest. This potential is expected to remain the same regardless of the alternative, and it may be slightly less than under the existing situation because of the decommissioning of many unauthorized roads and trails under all alternatives. No other impacts on bighorn sheep are expected to occur from the proposed action or any of the alternatives. The determination for all alternatives is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

Birds

Bald Eagle

No active or historical bald eagle (*Haliaeetus leucocephalus*) nests or winter roosts occur on the White River National Forest, although several nests occur within a few miles of the forest. A pair of bald eagles was documented at a nest site on the Forest on April 20, 2006. This pair was seen perched on a nest previously successfully used by osprey in past years. There was no activity indicating that the eagles had laid eggs at this nest this season. Most eagles nesting in this portion of the state have hatched young by mid-April, so it is assumed that this pair is early in territory establishment and may continue to use this nest in the future. The nest site was monitored in 2007 and the eagles were also on the nest, but no actual nesting activity was documented. No eagles were seen at the nest site during the spring of 2008.

The major impacts on bald eagles are recreation activities that may affect eagle foraging behavior associated with the larger reservoirs on the forest (USDA Forest Service/White River National Forest 2002b). The alternatives may change the amount of recreation use of some of these reservoirs through increasing or decreasing public access. Habitat manipulation that may affect important eagle habitats is not a portion of any alternative. Potential impacts associated with the proposed action and all alternatives are confined to the impacts associated with harassment, either intentional or unintentional, and displacement from preferred habitats due to human presence. Bald eagles that use areas frequented by humans may become accustomed to the existing level of disturbances. New or changed uses may result in changed behavior by eagles, including avoidance.

The alternatives for the travel management plan vary in the locations and types of travel-related access provided within bald eagle habitats (table BA-6). These alternatives are discussed below as they relate to the large river systems and reservoirs on the forest where potential impacts on eagles may occur.

Eagles have been documented to forage on carrion on big game winter ranges on the forest. This use is felt to be secondary to the use of the large river systems throughout the area. Although the alternatives do vary in the number and miles of roads and trails associated with big-game winter ranges on the forest, the differences are minor and would not affect eagle use of these areas to any great extent. Eagles foraging on the carcass of a big-game animal on the winter range may be displaced as recreationists travel on designated routes; however, the birds would normally return to normal behavior

as soon as the disturbance is removed. Because of planned decommissioning of roads and trails, all alternatives would result in an overall reduction in the number of miles of roads and trails in potential bald eagle habitats.

Summer

The summer season analysis for this species was the same as for river otter, above. The major river systems on the forest were buffered by one-half mile to account for animals foraging outside the immediate riparian zone.

Table BA-12. Winter motorized and non-motorized routes and play areas within one-half mile of the major river systems on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	1.17	1.17	1.14
Mechanized	0.20	0.20	0.24
Motorized/mechanized	1.36	1.36	1.39
Foot/horse	0.44	0.44	0.40
Total	1.80	1.80	1.79
Scheduled for decommission (reduction in density)	0.00	0.37	0.28

Approximately 54 square miles of potential habitat were analyzed for this species.

Authorized uses under alternative F are similar to alternative A. Alternative G reduces motorized use by 1 mile, increases mechanized use by1.5 miles and decreases foot/horse access by 2 miles. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in alternatives F and G when compared to the current, existing situation.

The forest plan provides direction that includes significant protection for riparian areas that would be the primary habitat for bald eagle on the White River National Forest. This direction includes watershed conservation practices (WCP) standards and guidelines (USDA Forest Service Handbook); riparian protection standards and guidelines for grazing (USDA Forest Service/White River National Forest 2002a, page 2-11); and standards for protection of sensitive species and their habitats (USDA Forest Service/White River National Forest 2002a, page 2-19). The newly documented potential nest area described above would not be affected by any of the alternatives.

Winter

The major river systems potentially used by bald eagles would not be affected by decisions under any of the alternatives being considered. These rivers are all adjacent to major transportation systems such as federal or state highways that are plowed though the winter to provide for public access. No major changes are identified for any of these areas under any of the alternatives.

Determination

No direct impacts on bald eagle habitat are expected to occur under any of the alternatives under either summer or winter conditions. Bald eagles may be displaced from potential habitats during periods of time when human uses are occurring.

Most of the important habitats for bald eagles are located on private lands along the major river corridors adjacent to the White River National Forest. No impacts on the river

corridors, reservoirs, and lakes on the forest would result from any alternative. The riparian protection direction included in the forest plan, coupled with the lack of direct habitat alterations under all alternatives and the overall reduction in road and trail densities over the existing situation, indicate a low likelihood of detrimental impacts on this species from the proposed action or any alternatives, especially during the summer months. During the winter months, eagles may be temporarily displaced from portions of preferred habitats during periods of recreation use of the riparian corridors. This displacement is expected to be short-term, occurring only during the actual period of recreation use; displacement is expected to be limited to the immediate vicinity of the human use. Other suitable habitats for any displaced wintering bald eagles are found throughout the general area of the forest.

Some eagles do forage over big-game winter ranges on the forest, and changes to the use of those winter ranges are included under some of the alternatives associated with this draft environmental impact statement. Since no ground-disturbing activity is proposed, no eagle habitat would be directly affected by the proposed action or any alternatives. It is possible that an eagle may occasionally be displaced from foraging in habitats associated with the winter ranges on the forest because of human use of motorized and non-motorized transportation on the designated routes and play areas, especially within the 5.41 management areas on the forest. This displacement would be minor and eagles would return to favored habitats and normal behavior patterns as soon as the displacement activities cease. Overall mileage of roads and trails open to human uses on the White River National Forest would decrease in comparison to the existing situation under all the alternatives. Human use of winter range areas will be regulated under the forest plan direction for these areas and the effects of any displacement will be minor and short-term. Because of the low level of potential impacts and the small likelihood of displacement occurring, the effects of the proposed action and all alternatives would be insignificant and discountable. Therefore, the determination for bald eagle is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

White-tailed Ptarmigan

The white-tailed ptarmigan (*Lagopus leucerus)* was not covered by the BE for the forest plan. The white-tailed ptarmigan inhabits alpine tundra, rocky alpine slopes and high meadows. In winter, the ptarmigan will migrate elevationally to forage among willows, either above timberline or in subalpine sites near tundra regions. Under extreme winter conditions, they may venture as low as 8,000 feet along streams lined by willows or alders. Summer habitat is above timberline or in subalpine sites near tundra regions. Ptarmigan nest among rock fields or tundra grasses adjacent to sheltering rocks. A small percentage of white-tailed ptarmigan may nest among willow or krummholz. Pair formation begins in late April when females return to the breeding grounds; they lay four to eight eggs in early June. Construction of high-elevation reservoirs, wild herbivore grazing, domestic livestock grazing, road construction along stream courses, and outdoor recreation such as ski area development and snowmobile activity can all reduce the availability of white-tailed ptarmigan winter forage (Andrews and Righter 1992, Kingery 1998). White-tailed ptarmigan have been documented nesting in the Flat Tops on the Blanco Ranger District and along the Continental Divide on the Aspen, Sopris, Holy Cross, and Dillon ranger districts.

Summer

The analysis for this species (table BE-13) considered the potential impacts on areas identified as being in the alpine life zone, specifically alpine willow habitats. Two different analyses were used to evaluate potential impacts from the proposed action; the first looked at all lands within the alpine zone and the second focused only on areas mapped as alpine willow in the forest GIS coverages.

Alpine areas are defined as areas that rise above the cold limits of trees. There are approximately 304,000 acres (475 square miles) of alpine habitats on the White River National Forest. These areas have severe weather conditions with very short growing seasons. Soils are generally very shallow and take many years to reestablish following disturbances.

The forest plan specifically identified direction to add to the protection of alpine areas of the forest (USDA Forest Service/WRNF 2002a, USDA Forest Service/WRNF 2006a).

Table BE-13. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

Approximately 475 square miles of potential habitat were analyzed for this species.

Within alpine habitats, alternative F does not change any authorized travelways from Alternative A. Alternative G reduces motorized use by about 3 miles, mechanized by 7 miles and foot/horse by 3 miles. Planned decommissioning of travelways would reduce open travelway density in Alternative G when compared to the current, existing situation and Alternative F.

Of the estimated 475 square miles of alpine area (304,000 acres) on the White River National Forest, approximately 50 square miles (32,000 acres) are mapped as containing willow communities in the riparian-non-forested GIS coverage. The analysis completed for alpine willow (table BE-14) assessed the number of miles of roads and trails open to the differing types of use where they crossed alpine willow communities by alternative.

Table BE-14. Travelway densities by alternative for lands within the alpine willow communities on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.15	0.15	0.15
Mechanized	0.14	0.14	0.15
Motorized/mechanized	0.30	0.30	0.30
Foot/horse	0.41	0.41	0.47
Total	0.71	0.71	0.77
Scheduled for decommission (reduction in density)	0.00	0.17	0.12

Approximately 53 square miles of potential habitat were analyzed for this species.

For alpine willow communities, alternative F and A are identical. Alternative G would increase mechanized road and trail density over alternative A and F by 0.08 miles and would all a total of approximately 3.2 miles of foot and horse travelways. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in all the alternatives when compared to the current, existing situation.

The forest plan contains direction that would result in additional protection for alpine communities above those that existed prior to the revision effort. This direction includes the rangeland ecosystem management standards and guidelines covering general livestock management (USDA Forest Service/White River National Forest 2002a) and alpine standards and guidelines (USDA Forest Service/White River National Forest 2006a). These standards and guidelines are all specifically designed to maintain alpine ecosystems and help to protect white-tailed ptarmigan habitats.

Winter

Winter travel routes should not affect alpine willow communities because these routes are established to avoid areas of vegetation that would potentially be affected. Play areas that are used by skiers or snowmobilers and that overlap alpine willow areas may incur some detrimental impacts on plants. The level of impacts would depend on the snow depth at the time of the use and on the type and amount of use. It is not possible to quantify the level of potential impacts but it is expected to be very low. On developed ski areas some impacts to suitable ptarmigan habitat may occur from snow compaction activities and disturbances from human uses.

Determination

Alternatives F and G would reduce overall travelway densities when compared to the existing situation. Over time, many of these decommissioned travelways will be reclaimed to native vegetation, which will improve habitat characteristics for ptarmigan and other alpine-dwelling species. Of the alternatives, alternative F would result in the least motorized use, which would be the most beneficial for wildlife species using these areas. Impacts from the minor increases in mechanized and foot/horse use in Alternative G would be impossible to measure. Motorized and mechanized use would be limited to designated travelways on existing routes, and most foot and horse use would be on established trails. This type of use is not expected to lead to direct impacts on populations or individuals of white-tailed ptarmigan. Some disturbance to ptarmigan is possible because of the continued recreation use of suitable habitats by motorized, mechanized, and foot/horse travel. Some disturbance impacts may result from winter recreation use of

areas being used by ptarmigan. The determination for the proposed action under all alternatives is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

Columbian Sharp-tailed Grouse

The Columbian sharp-tailed grouse (*Tympanachus phasianellus columbianus)* was not covered by the BE for the forest plan. The Columbian sharp-tailed grouse inhabits mid elevation mountain sagebrush and grasslands habitat, usually adjacent to forested areas. Dancing areas (leks) are located in open areas with short or sparse vegetation. Nests are usually within a half-mile of a lek, under a shrub or tree or within a few feet of shrub cover. Males first visit the lek in the fall and begin lek dancing in early April in the mountains, continuing into June. Females arrive in mid to late April to select mates. Eggs are olive to dark buff brown with slight purplish tint when first laid. Populations of the Columbian race fluctuate in numbers considerably from year to year; however, over the long term the populations appear stable, based on data from lek counts. This subspecies now occurs only in isolated pockets across former range. They once occurred across the western slope; today they inhabit a few spots in five western slope counties (Andrews and Righter 1992, Barrett and Overly 1992, Kingery 1998). They are documented as probable breeders in Rio Blanco County, with potential habitat on the northwest corner of the Blanco Ranger District. Columbian sharp-tailed grouse were found historically on Oak Ridge on the Blanco District and the Lower Blue River on the Dillon Ranger District.

Summer

The analysis for this species (table BE-15) included the number of miles of roads and trails, by use type, within the Aldridge Lakes Lynx Analysis Unit (determined to be a good representation of the potential range for Columbian sharp-tailed grouse).

Table BE-15. Travelway densities by alternative for lands within potential sharp-tailed grouse habitat on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	1.42	1.42	1.36
Mechanized	0.57	0.57	0.03
Motorized/mechanized	1.99	1.99	1.38
Foot/horse	0.02	0.02	0.55
Total	2.00	2.00	1.93
Scheduled for decommission (reduction in density)	0.00	0.05	0.09

Approximately 38 square miles of potential habitat were analyzed for this species.

Authorized uses are the same under alternatives A and F. Alternative G would decrease motorized (2 miles) and mechanized mileage (20 miles, 95%) over alternative A and F (approximately 1 mile total). Foot/horse routes would increase by 20 miles in Alternative G. Planned decommissioning and rehabilitation of travelways would reduce open motorized and mechanized travelway density in alternatives F and G, when compared to the current, existing situation.

Winter

Suitable winter sharp-tailed grouse habitat is below the area generally used by winter recreationists. Therefore, no changes in the potential impacts on this species are expected to occur because of the proposed action concerning winter uses.

Determination

Because no direct habitat impacts would result from the proposed action, because there will be decreased motorized and mechanized opportunities would result from alternative G in any potential habitat areas, and because foot and horse traffic has not been identified as a detrimental risk factor for Columbian sharp-tailed grouse, the determination for all alternatives is **NO IMPACT.**

Sage Sparrow

The sage sparrow (*Amphispiza belli)* was not covered by the BE for the forest plan. The sage sparrow nests primarily in 1- to 3-foot high sagebrush stands that line hills and basins in large unbroken stands. It is seldom seen in the tall sagebrush that lines damp drainages, or in the short mountain sagebrush that grows at high elevations. This migrant bird begins to arrive in late February and is on breeding territories by March. In migration sage sparrows move through the lower elevation greasewood stands. This sagebrush obligate is known to occur only on the Rifle Ranger District, where it breeds very near to the forest boundary on Bureau of Land Management (BLM) land along the Sunnyside road. A local population on private lands near Eagle was recently extirpated because of loss of habitat to commercial and residential development.

Winter

Sage sparrows are migratory and will not be directly affected by any winter use of the forest. No sage sparrow habitats will be detrimentally impacted by any of the alternatives.

Determination

All known and suspected habitat for sage sparrow on the White River National Forest is within the Lower Battlement Mesa Research Natural Area on the Rifle Ranger District. No motorized or mechanized use and no new trails are allowed or proposed within RNAs. This portion of the forest has very poor public access and receives very little recreation or other use throughout the year. There will be no changes to the existing situation due to the proposed action. The determination for all alternatives is **NO IMPACT.**

Northern Harrier

The northern harrier (*Circus cyaneus)* was not covered by the BE for the forest plan. The northern harrier nests in a wide variety of open grasslands, wet meadows, and shrublands at all elevations. Most nest at elevations from 6,000 to 8,000 feet but they also nest at other elevations, from below 5,000 feet to mountain grasslands on the Flat Tops at more than 10,000 feet. For breeding and hunting, harriers select parts of the habitat with dense cover such as swales, draws, fencerows, and canal banks. Because of their well-developed auditory capability, harriers can find their prey in dense vegetation. They fly low over a field listening and watching for prey. Nests are built of dry sticks, straw, weed stems, and grasses, on the ground or often on top of a low bush. Harriers arrive from winter grounds in March and April and depart in October and November. They nest from April through July. Harriers have been reported in Garfield, Rio Blanco, and Eagle

counties on the White River National Forest. Breeding Bird Atlas data showed few blocks with harriers at high elevations and in dry areas (Andrews and Righter 1992, Barrett and Overly 1992, Kingery 1998). Harriers are known to nest in wet meadows, sagebrush, and montane shrub on the lower Flat Tops.

Summer

For this analysis, two habitat types were considered—shrublands and grass/forb habitats (tables BE-16 and BE-17). Both these evaluations cover a much wider range of elevations and wider distributions than harriers would be expected to use; however, they are considered to be adequate for the purposes of assessment of the potential impacts of the proposed action on this species.

Table BE-16. Travelway densities by alternative for lands within potential harrier habitats within shrubland habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.99	0.99	0.85
Mechanized	0.27	0.27	0.18
Motorized/mechanized	1.26	1.26	1.03
Foot/horse	0.33	0.33	0.41
Total	1.59	1.59	1.44
Scheduled for decommission (reduction in density)	0.00	0.33	0.44

Approximately 434 square miles of potential habitat were analyzed for this species.

For authorized uses within shrubland communities that may support this species alternative F and A are identical. Alternative G reduces motorized and mechanized road and trail density, and increases foot and horse density over alternative A. Planned decommissioning of travelways would reduce open travelway density in all the alternatives.

Table BE-17. Travelway densities by alternative for potential harrier habitat within the grass/forb meadow habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.86	0.86	0.74
Mechanized	0.24	0.23	0.17
Motorized/mechanized	1.10	1.09	0.91
Foot/horse	0.61	0.61	0.65
Total	1.70	1.70	1.57
Scheduled for decommission (reduction in density)	0.00	0.33	0.46

Approximately 557 square miles of potential habitat were analyzed for this species.

Within grass/forb habitats, alternatives A and F allow approximately the same authorized uses. Alternative G would reduce a total of approximately 65 miles of motorized travelways and 35 miles of mechanized routes, while adding approximately 25 miles of foot and horse access. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in alternatives F and G when compared to the current, existing situation.

Winter

The northern harrier is a migratory species and would not be affected by any of the activities associated with winter use of the forest. No harrier habitat would be affected by winter uses.

Determination

Continued recreation use of the forest may result in a minor level of disturbance to northern harriers throughout the summer months when the birds may be present on the forest. The level of this disturbance is expected to be so minor as to be immeasurable. Based on the assumptions listed earlier in this document and on the fact that alternatives F and G would result in an overall reduction in travelway density over the existing situation, the determination for these alternatives for the effects of the proposed action on the northern harrier is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum)* was not covered by the BE for the forest plan. Peregrine falcons occur throughout western Colorado as a spring and fall migrant in western valleys, foothills, lower mountains, and mountain parks. Peregrines nest on high precipitous cliffs and river gorges. They forage over adjacent coniferous and riparian forests and at times in other habitats. Peregrine falcons prefer to nest in a shallow depression scraped in gravel or debris on high cliff ledges. They will also use old stick nests from ravens and hawks. Peregrines rarely nest above 8,500 feet. These falcons nest from March to June, arriving in March and departing in October. Migrants and winter residents occur mostly around reservoirs, rivers, and marshes; however, they may also be seen in grasslands, agricultural areas, and less often in other habitats. Peregrine numbers in Colorado plummeted in the 1950s and 1960s because of eggshell thinning due to the use of DDT, reaching a low in 1977 when only four nesting pairs were recorded in the state. The number of active sites and young birds produced increases annually in Colorado largely because of intensive recovery and release efforts (Andrews and Righter 1992, Kingery 1998). Breeding peregrines have been documented on the Rifle, Holy Cross, Eagle, Dillon, and Sopris ranger districts.

The peregrine is a habitat specialist concerning nesting habitat and somewhat of a generalist in choice of foraging habitats. They nest only on high cliffs but feed over a wide range of habitats. It was not possible to identify specific habitats that could be analyzed through the GIS system for this species.

Summer

Overall, there will be reduced road/trail density across the forest for alternatives F and G when compared to the current, existing situation.

Nesting peregrines are susceptible to nest-site disturbance from recreational rock climbers. None of the alternatives are expected to increase this type of activity or disturbance. Forest plan direction specifically protects raptor nesting areas (USDA Forest Service/White River National Forest 2002a, page 2-17). General public use of roads and trails across the forest is not expected to lead to increases in any type of activity that would be detrimental to nesting or foraging peregrine falcons.

Winter

Peregrines are migratory and would not be affected by any activities associated with winter travel alternatives on the forest. No peregrine habitat would be affected by winter travel uses.

Determination

The forest plan contains direction specifically to protect nesting raptors (USDA Forest Service/White River National Forest 2002a, pages 2-17 and 2-19). Implementation of this direction will provide adequate protection for nesting peregrines from the types of activities that may be associated with the proposed action. There would be no impacts on peregrine habitat from any of the alternatives. No increases in disturbance activities are expected from the alternatives. The determination for the peregrine falcon for all alternatives is **NO IMPACT**.

Brewer's Sparrow and Northern Sage-grouse

Brewer's sparrow

The Brewer's sparrow (*Spizella breweri*) was not covered by the BE for the forest plan. This bird inhabits sagebrush-dominated (primarily big sagebrush) shrublands and mountain parks. They may also be found in timberline willow stands (Kingery 1998). Colorado Breeding Bird Atlas locations for Brewer's sparrow indicate preference for sagebrush of middle heights. Moderate, incomplete burns in sagebrush (typical of prescribed fires) do not harm important components of nesting habitat. In the sagebrush community, Brewer's sparrows take on the foliage-feeding position, while sage and vesper sparrows, their close associates, forage mostly on or from the ground. Brewer's sparrows start to arrive on breeding grounds in mid April. Nests are found in large, living sagebrush averaging from 16.5 to 41 inches tall. They typically lay three to five eggs. After fledging, the Brewer's sparrow family often moves to higher elevations, mixing with other species, especially chipping sparrows, before beginning fall migration. Colorado Breeding Bird Atlas information showed the largest concentration of this sagebrush-obligate to be concentrated in the counties with the most sagebrush—Moffat, Rio Blanco, Jackson, and Gunnison. They are confirmed nesters in Garfield, Eagle, Pitkin, and Summit counties on the White River National Forest (Andrews and Righter 1992, Kingery 1998). Brewer's sparrows have been documented in large sagebrush areas on the White River Plateau on the Eagle, Blanco, and Rifle districts; near DeBeque; and in the Alkali Creek drainages on the Rifle Ranger District.

Northern Sage-grouse

The northern sage-grouse *(Centrocercus urophasianus)* was not covered by the BE for the forest plan. Although historical records indicate that sage-grouse were found in suitable habitat across the forest, they have been extirpated across much of their range. The White River National Forest has never had the wide expanses of sagebrush necessary to support large, viable populations of sage-grouse. All populations of sage-grouse on the forest have depended on the large expanses of sagebrush found on adjacent BLM and private lands. Sage-grouse are currently found in small numbers only on the Eagle and Dillon ranger districts.

Summer

The analysis for sage-grouse and Brewer's sparrow (table BE-18) included all the roads and trails located within areas mapped as sagebrush in the White River Vegetation GIS

coverage. This is a much larger area than is currently occupied by either of these species on the Forest, but is considered to give the best estimate of potential impacts to these species.

Table BE-18. Travelway densities by alternative for lands within the sagebrush communities on the White River National Forest*

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	1.64	1.64	1.28
Mechanized	0.27	0.27	0.18
Motorized/mechanized	1.91	1.91	1.47
Foot/horse	0.29	0.29	0.38
Total	2.20	2.20	1.85
Scheduled for decommission (reduction in density)	0.00	0.49	0.75

Approximately 73 square miles of potential habitat were analyzed for this species.

Within sage-grouse and Brewer's sparrow habitat, alternatives A and F provide the same authorized uses. Alternative G reduces motorized use by 26 miles (21%) and mechanized by 6 miles (35%). Foot and horse access is increased by 6 miles on current, established routes. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in alternatives F and G when compared to the current, existing situation.

Sagebrush habitats would not be directly affected by any of the decisions proposed under this draft environmental impact statement; however, some sagebrush areas may benefit in the long term from road and trail decommissioning planned under some alternatives. This decommissioning would result in the eventual reestablishment of those areas into native vegetation with the added benefit of fewer disturbances from human uses. The literature does not indicate concerns about disturbance effects from motorized use of roads or trails in sagebrush areas for Brewer's sparrow or for sage-grouse, outside of mating season for sage-grouse when birds are on leks. One existing lek for sage-grouse is documented on National Forest System lands on the Dillon Ranger District. This lek is not located adjacent to any existing roads or trails. Disturbance effects from the use of roads or trails are expected to be minimal for both of these species under all alternatives.

The forest plan contains direction that results in additional protection for sagebrush-dependent wildlife resources above those that existed prior to the revision effort. This direction includes the rangeland ecosystem management standards and guidelines covering general livestock management (USDA Forest Service/White River National Forest 2002a, page 2-10 to 2-11); and sage-grouse and Brewer's sparrow standards and guidelines (USDA Forest Service/White River National Forest 2002a, page 2-25 to 2-26). These standards and guidelines all are specifically designed to maintain sagebrush habitats in a condition that will provide suitable habitat for these species.

Winter

Brewer's sparrows are migratory and will be gone from the forest during the period of time winter travel is occurring. Winter motorized travel may affect sagebrush areas through impacts associated with direct crushing or compacting of snow. These impacts are expected to be minor across the existing range of sagebrush on the Forest. There minor impacts may result in immeasurable impacts to Brewer's sparrow from winter travel management alternatives.

For sage-grouse, no significant winter impacts on habitat are expected from any of the alternatives being considered. The great majority of the sagebrush areas that have the potential to support sage-grouse are located within management areas that provide additional protection from disturbances associated with winter recreation use (management areas 5.41and 5.43). Winter uses of these management areas are restricted to designated routes and play areas. It is not anticipated that sage-grouse populations will be subject to measurable disturbance impacts under any of the proposed alternatives.

The proposed action is not expected to change either population or habitat trends for these species at the forest level for the following reasons:

- The lack of significant direct detrimental habitat alterations from the proposed action;
- The protection direction included in the forest plan for the habitat of these species;
- The low likelihood of increased recreational disturbance impacts associated with any of the alternatives;
- The limited changes in the overall miles of travelways for all alternatives;
- The overall reduction in road and trail densities for all alternatives over the existing situation due to future decommissioning efforts; any direct habitat enhancement that results from the decommissioning of travelways would be too minor to allow meaningful analysis of either habitat or population trends.

Determination

Because sagebrush habitat would not be significantly directly adversely affected under any of the alternatives proposed in this supplemental draft environmental impact statement; because forest plan standards provide protections to sagebrush resources; because of the amount of planned decommissioning of existing routes that will result in long-term beneficial results; and because there is limited potential for impacts on individuals or populations because of the limited scope of the changes associated with the proposed action, the determination for Brewer's sparrow and northern sage-grouse for all alternatives is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

Northern Goshawk

The northern goshawk (*Accipiter gentiles)* is covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). The goshawk is a forest raptor that depends on forested stands with dense canopy closure. It has been documented throughout the White River National Forest in suitable habitat. The major risk factor identified for the goshawk is vegetation management that reduces nesting habitat values. On the White River National Forest, nests have been found mostly in stands of mixed aspen and conifer.

Because of the rather wide range of habitats used for nesting and foraging, the analysis for this species included all forest acres (table BE-19).

Table BE-19. Travelway densities by alternative for lands within the forested habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.47	0.47	0.42
Mechanized	0.20	0.20	0.17
Motorized/mechanized	0.67	0.66	0.58
Foot/horse	0.35	0.35	0.36
Total	1.01	1.01	0.95
Scheduled for decommission (reduction in density)	0.00	0.00	0.25

Approximately 2226 square miles of potential habitat were analyzed for this species.

Within forested habitats, alternative F decreases mechanized access by approximately 5 miles forest-wide, while increasing foot/horse use by 4 miles. Alternative G decreases motorized travelways by 110 miles and mechanized by 69 miles. This alternative increases foot/horse by 39 miles. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in all the alternatives when compared to the current, existing situation.

Winter

The northern goshawk does migrate at times but is also found near its summer territory if prey remains available during the winter months. Winter recreation use has not been identified as a risk to goshawk. There would be no expected detrimental impacts on the species from winter use of roads or trails on the forest under any of the alternatives.

Determination

There will be no new road or trail construction under any of the alternatives. Some disturbance impacts due to human use of roads and/or trails through occupied goshawk territories are possible, especially during the nesting season. This disturbance is expected to be very localized and restricted to the actual time humans are using the immediate area of a nesting territory, with birds returning to normal behavior as soon as the humans leave the area. General recreation use of forest roads and trails has not been identified as a detrimental risk factor for the goshawk. The decommissioning and rehabilitation of travelways would reduce overall travelway densities in alternatives F and G. Overall, for these alternatives, the determination is **MAY IMPACT INDIVIDUALS BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

Boreal Owl

The boreal owl (*Aegolius funereus)* is covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/White River National Forest 2002a) The boreal owl is a forest raptor that depends on forested stands with dense canopy closure. It has been documented on the White River National Forest in suitable habitat. The major risk factor identified for the boreal owl is vegetation management that reduces nesting habitat values, especially nesting cavities.

The analysis for boreal owl included the roads and trails by use type on all the acres of conifer forest types across the White River National Forest (table BE-20).

Table BE-20. Travelway densities by alternative for lands within boreal owl habitat on the White River National Forest.

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.49	0.49	0.44
Mechanized	0.21	0.21	0.19
Motorized/mechanized	0.70	0.70	0.63
Foot/horse	0.37	0.37	0.38
Total	1.06	1.07	1.00
Scheduled for decommission (reduction in density)	0.00	0.26	0.32

This analysis was based on habitats that support snowshoe hare and lynx with the assumption that this closely represents boreal owl habitat on the White River National Forest.

Approximately 1786 square miles of potential habitat were analyzed for this species.

Alternative F would slightly decrease the miles of mechanized use (approximately 1 mile) over alternative A and would increase foot/horse use by 3 miles across the potential habitat for the boreal owl. Alternative G would reduce about 92 miles of motorized routes and about 34 miles of mechanized use while increasing foot and horse use by 16 miles. Because of planned decommissioning and rehabilitation of travelways, all alternatives would result in fewer miles of roads and trails than under the current, existing situation.

Winter

There are no anticipated impacts on this species from any of the winter use alternatives. There would be no direct impacts to boreal owl habitat under any of the alternatives. The majority of its habitat is inaccessible to normal modes of transportation during the winter months due to vegetation and topology, and there is no indication that the species would be affected by recreational or administrative use of the forest during winter.

Determination

There would be no direct impact on boreal owl habitat under any of the alternatives being considered. Boreal owls are tree roosting and nesting owls that have not been documented to be detrimentally affected by general use of roads or trails. No disturbance impacts are expected to occur under any of the alternatives. Since no habitat would be affected and the boreal owl would not have disturbance impacts under the proposed actions, the determination for all alternatives is **NO IMPACT.**

Flammulated Owl

The flammulated owl (*Otus flammeolus)* is covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). The flammulated owl is a forest raptor that depends on forested stands with dense canopy closure. It has been documented on the White River National Forest in suitable habitat. The major risk factor identified for the flammulated owl is fire suppression and logging of older forests that reduces nesting habitat values, especially nesting cavities.

Winter

The flammulated owl is a migratory species and would not be affected by any winter use of roads or trails under any of the alternatives being considered. None of its habitat would be directly affected by any of the proposed actions.

Determination

There would be no direct impact on flammulated owl habitat under any of the alternatives being considered. Flammulated owls are tree roosting and nesting owls that have not been documented to be detrimentally affected by general use of roads or trails. No disturbance impacts are expected to occur under any of the alternatives. Since no habitat would be affected and the flammulated owl would not have disturbance impacts, the determination for under the proposed actions, all alternatives is **NO IMPACT.**

Olive-sided Flycatcher

The olive-sided flycatcher (*Contopus borealis)* is covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). The olive-sided flycatcher is a forest edge species that has been showing population declines across its range. The reasons for the decline have not been identified. One possible risk factor is the removal of snags used for perching and foraging.

The analysis of changes to travel management completed for boreal owl (see above, table BE-20 and associated narrative) would be appropriate to consider for this species as well.

Winter

The olive-sided flycatcher is a migratory species and is absent from the forest during winter. Therefore, it would not be affected by any winter use of roads or trails under any of the alternatives being considered. None of its habitat would be directly affected by any of the proposed actions.

Determination

There would be no direct impact on olive-sided flycatcher habitat under any of the alternatives being considered. These birds have not been documented to be detrimentally affected by general use of roads or trails. No disturbance impacts are expected to occur under any of the alternatives. Since no habitat will be affected and the olive-sided flycatchers will not experience disturbance impacts, the determination for all alternatives is **NO IMPACT.**

American Three-toed Woodpecker

The American three-toed woodpecker (*Picoides tridactylus)* is covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). The three-toed woodpecker is a cavity nester that prefers spruce-fir forests.

Summer

The analysis completed for boreal owl (see above, table BE-20 and associated narrative) would be appropriate to consider for the three-toed woodpecker as well. There would be no direct habitat alterations under any of the alternatives being considered. This species

has not been reported in the literature to be susceptible to disturbance from normal recreation and administrative use of forest roads and trails.

Winter

There would be no direct habitat impacts under any of the alternatives being considered. The American three-toed woodpecker has not been reported in the literature to be susceptible to disturbance from normal winter recreation and administrative use of forest roads and trails. None of its habitat would be directly affected by any of the proposed actions.

Determination

There would be no direct impact on three-toed woodpecker habitat under any of the alternatives being considered. These birds have not been reported in the literature to be detrimentally affected by general use of roads or trails. No disturbance impacts are expected to occur under any of the alternatives. Since no habitat will be affected and three-toed woodpeckers would not experience disturbance impacts, the determination for this species for all alternatives is **NO IMPACT.**

Lewis' Woodpecker

The Lewis' woodpecker (*Melanerpes lewis)* is covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). This species is found in the mature ponderosa forests and cottonwood galleries along the major rivers in western Colorado. The primary risk factor identified for this species is the lack of fire in the ponderosa pine habitats.

Lewis' woodpecker has not been documented on the White River National Forest but is known to occur in the Colorado River and Roaring Fork River Valleys in close proximity to the forest. The White River National Forest has only limited ponderosa pine and few cottonwood galleries of sufficient size to support populations of this species. The Lewis' woodpecker has not been recorded in those stands during formal or informal survey efforts.

The proposed action would not affect any potential habitat for this species under any of the alternatives being considered. The species has not been reported in the literature to be sensitive to human disturbances and several nest in one of the busy river-side parks in downtown Glenwood Springs.

Winter

It is not known whether or not populations in the vicinity of the White River National Forest are migratory in the winter months. Regardless, no potential impacts have been identified for this species under any of the alternatives.

Determination

There would be no direct impact on Lewis' woodpecker habitat under any of the alternatives being considered. These birds have not been reported in the literature to be detrimentally affected by general use of roads or trails. No disturbance impacts are expected to occur under any of the alternatives. Since no habitat will be affected and Lewis' woodpeckers would not experience disturbance impacts, the determination for this species for all alternatives is **NO IMPACT.**

Ferruginous Hawk

The ferruginous hawk (*Buteo regalis)* is covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). The ferruginous hawk is a grassland species that is known on the White River National Forest only from incidental sightings during migration. The primary risk factors for the species are conversions of grasslands and prairie dog control programs. Neither of these factors would be a consideration on the White River National Forest because there are no prairie dogs on the forest and the forest does not convert grasslands to croplands.

Winter

The ferruginous hawk is a neotropical migrant and is absent from the forest during the winter months. No impacts to its seasonal habitats on the forest are expected to occur under any of the alternatives. There would be no impact on the species from any of the winter travel management alternatives.

Determination

There would be no direct habitat alterations under any alternative. As the ferruginous hawk is documented from the forest only during migration, no disturbance to breeding or nesting individuals will occur. Normal recreation use of the roads and trails on the forest is not expected to affect any individuals that may be using the forest during migration periods. There will be **NO IMPACT** to this species from any alternative.

Black Swift

The black swift (*Cypseloides niger)* is covered in the BE for the forest plan; further information about life history can be found in that document (USDA Forest Service/WRNF 2002a). The black swift has very specialized habitat requirements for nesting; it nests only in association with waterfalls and often places its nest immediately behind the waterfall itself. Black swifts feed almost exclusively on flying ants. Identified risks to the species include recreational activities on the cliffs associated with the waterfalls.

The forest plan has specific direction that restricts recreational activities that could affect black swift nesting habitats; forest plan direction also maintains water flow and vegetation associated at black swift colonies (USDA Forest Service/WRNF 2002a, page 2-28). This direction is adequate to protect black swift individuals and colonies from impacts associated with forest management activities, including travel management issues. Black swifts are known to successfully nest adjacent to areas receiving heavy recreational hiking use so use of existing trails is not believed to create impacts to this species (Kim Potter, pers. comm.).

Winter

The black swift is a neotropical migrant and is absent from the forest during the winter months. There would be no impact on the species or its habitats from any of the winter travel management alternatives.

Determination

There would be no direct habitat impacts under any of the alternatives. Direction included in the forest plan would provide adequate protection from management activities to

nesting habitat. There should be no increase in disturbance-related activities due to any alternatives. Foraging habitat would not be affected in any way by any alternatives. Therefore, there would be **NO IMPACT** to the black swift under any alternative.

Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus)* is covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). This is an open grassland species that sometimes uses open pinyon-juniper woodlands. No specific risk factors have been identified for the shrike on the White River National Forest on in Colorado. Shrikes have been reported in the Coulter Mesa area of the White River National Forest.

Winter

The loggerhead shrike is a neotropical migrant and is absent from the forest during the winter months. There would be no impact on the species or its habitats from any of the winter travel management alternatives.

Determination

There would be no direct habitat impacts from any alternative. The literature does not indicate that this species is sensitive to general recreation and administrative use of forest roads and trails. The likelihood of disturbance resulting in detrimental impacts on individuals or populations is very slim to none. Therefore, the determination for all alternatives for this species is **NO IMPACT**.

Purple Martin

The purple martin (*Progne subis)* is covered in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). This species is a summer resident in western Colorado, nesting in mature aspen stands. No risk factors specific to the White River National Forest have been identified for the purple martin. Vegetation management that affects mature aspen stands has the potential to affect nesting habitat for this species. Melcher and Gross (2001) indicate that populations in the state may be stable.

Winter

The purple martin is a neotropical migrant and is absent from the forest during the winter months. There would be no impact on the species or its habtitats from any of the winter travel management alternatives.

Determination

There would be no direct habitat impacts from any alternative. There are no indications in the literature that the purple martin is affected by general recreation use of roads or trails. Since there are no direct or indirect impacts on purple martins from any of the alternatives, there would be **NO IMPACT** to this species.

Insects

Great Basin Silverspot

The Great Basin silverspot (*nokomis nokomis Speyeria)* was not covered by the BE for the forest plan. The Great Basin silverspot butterfly is a large and distinct fritillary that inhabits spring seeps and is associated with marshes with flowing water. It lives in wet meadows and seeps or sloughs at lower elevations, found only where there is permanent moisture sufficient to sustain a healthy violet crop at elevations from 5,200 to 9,000 feet. The Great Basin silverspot has one flight from mid-July to late September. The host plants or substrate plants sought by females for egg placement are specifically violets (*Viola* spp.), which provide food for newly hatched larva. Some populations have disappeared as a result of water diversion projects. The Great Basin silverspot is extremely local, restricted in habitat, and decidedly rare over the major portion of its range (Ferris and Brown 1981, Scott 1986). The Great Basin silverspot is not documented on the White River National Forest. The closest breeding colony is found at Unaweep Seep, on the Uncomphagre Plateau in western Mesa County.

Although the Great Basin silverspot has not been documented on the forest, adequate direction is found in the forest plan to protect potential habitats that may support undiscovered populations. This direction results in additional protection for riparian communities above those that existed prior to the revision effort. These standards and guidelines along with agency direction are designed to maintain high-quality riparian ecosystems on which this species is felt to depend.

Winter

Great Basin silverspots overwinter as eggs or larvae attached to plant detritus. Snowmobile or cross-country skiing use may compact areas where overwintering is occurring but this type of use is not expected to result in compaction rates that affect overwintering eggs or larvae.

Determination

There would be no direct habitat alteration due to the alternatives, and the riparian habitats on which the Great Basin silverspot depends would be protected from detrimental impacts by direction in the forest plan. The determination for this species is **NO IMPACT**.

Amphibians

Boreal Toad

The boreal toad (*Bufo boreas boreas)* is discussed in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). Hydrologic alteration of breeding ponds and the risk of disease are the primary threats to boreal toads from travel management. Little is known about how disease moves through the system but it is logical that increased human contact and disturbance could increase the risk of disease introduction to breeding ponds. The analysis focused on all travelways coming within 300 feet of breeding ponds. In addition to risk of spreading disease, increased motorized and non-motorized use increases the risk of harassment or death of individuals.

There are eleven known breeding boreal toad populations on the WRNF and four more within ½ mile of the Forest (two of the populations on the Forest were not available in GIS at the time this analysis was conducted and will be addressed with narrative)This species is sensitive to disease introductionThe analysis for this species included the amount of road or trail and type of use within 300 feet and ½ mile of known breeding locations (Table BE-21). There is no difference between alternatives within 300 feet of any of the boreal toad breeding sites and only one change within ½ mile of the Montezuma population (addition of 0.21 miles of mechanized, non-motorized trail in Alternative G). Although the impact is likely to be reduced since the new trail is not within 300 feet of the breeding population, it is possible that toads venturing away from the wetland may be impacted by this trail. There are two additional populations not in GIS and therefore not included in the analysis presented in Table BE-21 (Upper Homestake Reservoir and multiple locations along Lincoln Creek). For the Upper Homestake population, there is a trail (within the wilderness) that is included in alternative A that would be removed in both alternatives F and G, having a positive effect on this population. There are no other roads or trails within ½ mile of this population. For the Lincoln Creek populations, there are no differences between alternatives to any roads and trails along Lincoln Creek. There remains a possibility that unknown roads or trails may exist within 300 feet and certainly within ½ mile of each of these populations that may not be included in Table BE-21.

Table BE-21. Amount of road or trail and type of use within 300 feet and ½ mile of known boreal toad breeding populations

	Type of use	Vehicle Access (roads)	ATV and motorcycle	Mountain bike	Hiking and stock animals
Alt. A	within 300 ft	0.39	none	0.06	1.03
	within ½ mi	6.9	none	3.08	7.39
Alt. F	within 300 ft	0.39	none	0.06	1.03
	within ½ mi	6.9	none	3.08	7.39
Alt. G	within 300 ft	0.39	none	0.06	1.03
	within ½ mi	6.9	none	3.28	7.39

All units are displayed in miles.

Determination

For alternative F, the only change to any road or trail occurring within a half mile of any known breeding populations on the WRNF is the removal of the existing trail near the Upper Homestake population, which would reduce the risk of disease transmission to this population. Therefore, the determination for **alternative F** in comparison to alternative A the no action alternative is **BENEFICIAL IMPACT** on boreal toad. For Alternative G, the trail discussed near the Upper Homestake population would be removed with Alternative G also, having a beneficial effect on that population as discussed above. However, a new mountain bike trail is proposed within ½ miles of the Montezuma boreal toad breeding populations in Alternative G. Because of the potential for impacting toads dispersing from the breeding pond and increased risk of disease from human activity, the determination for **alternative G** is **MAY IMPACT INDIVIDUALS, BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE**.

Northern leopard frog

The northern leopard frog (*Rana pipiens)* is discussed in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). Hydrologic alteration of breeding ponds and the risk of disease are the primary threats to northern leopard frog from travel management. Little is known about how disease moves through the system but it is logical that increased human contact and disturbance could increase the risk of disease introduction to breeding ponds. The analysis focused on all travelways coming within 300 feet and ½ mile of breeding ponds. In addition to risk of spreading disease, increased motorized and non-motorized use increases the risk of harassment or death of individuals.

There are two known leopard frog breeding populations on the WRNF. The analysis for this species included the amount of road or trail and type of use within 300 feet and ½ mile of known breeding locations (Table BE-22). There are no roads or trails within a half mile of the June Creek population in the no action or either of the action alternatives. For the Sterry Lake population, there is no change between alternative F and alternative A, but roads and ATV trails are removed in alternative G, which would improve leopard frog habitat and reduce the risk of introducing disease.

Table BE-22. Amount of road or trail and type of use within 300 and ½ mile of known leopard frog breeding populations

	Type of use	Vehicle access (roads)	ATV and motorcycle	Mountain bike	Hiking and stock animals
Alt. A	within 300 ft	0.24	0.02	none	none
	within ½ mi	2.53	2.11	none	none
Alt. F	within 300 ft	0.24	0.02	none	none
	within ½ mi	2.53	2.11	none	none
Alt. G	within 300 ft	0.24	none	none	none
	within ½ mi	2.19	0.41	none	none

All units are displayed in miles

Determination

For alternative F, no changes to any roads or trails occur within a half mile of any known breeding populations on the WRNF. Therefore the determination for **alternative F** in comparison to the alternative A the no action alternative is **NO EFFECT** on leopard frog. For alternative G, roads and ATV trails are being closed near the Sterry Lake population. Depending on the type of road closure, there may be additional disturbance to this population in the **short term which could negatively affect the population, however the long-term effect to leopard frog is beneficial**. Because of the potential for shortterm disturbance associated with road and trail closure or obliteration, the determination for **alternative G** is **MAY IMPACT INDIVIDUALS, BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE**.

Fish

Colorado River Cutthroat Trout

The Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus)* is discussed in the BE for the forest plan; life history and other general information can be found in that document (USDA Forest Service/WRNF 2002a). Although the primary risk factors for this species are biological (exotic trout species and to some degree disease), roads can further impact these populations by creating barriers to fish movement, degrading habitat by constraining streams and eliminating riparian vegetation, introducing sediment, and by proving angler access possibly leading to non-native fish introduction or the spread of disease (e.g., whirling disease).

There are 32 subwatersheds containing at least one conservation population of Colorado River cutthroat trout. The RFP has a standard stating that total road density in subwatersheds containing conservation populations of Colorado River cutthroat trout may not be increased. Thirty-one watersheds with a conservation population meet that standard. **One watershed (the Blue River around Breckenridge [HUC 140100020506]) meets the standard in alternative F, but not in alternative G.** This subwatershed comprises 11 catchments, two of which contain conservation populations of CRCT. In these two catchments, French Gulch and Spruce Creek, while the analysis shows that the Level 1 roads added, they are only to be used as trails. The recommendation for the final is to accept these level 1 roads as trails to keep the road density down. It is also important to keep in mind that these roads are already present and not true additions, however our goal is to reduce road density in CRCT watersheds. The total road mileage and density for all subwatersheds with conservation populations of cutthroat are presented in Table BE-23. A substantial amount of roads are removed in all action alternatives, with Alternative G removing twenty percent of the existing road mileage. Removal of these roads would have a long-term benefit on Colorado River cutthroat trout. It is possible that reclamation activities would have a short-term negative effect on cutthroat trout due to sediment and possible direct channel impacts if crossings were removed. .

Table BE-23. Total road miles and road density (in miles per square mile) for all 6th level watersheds containing a conservation population of Colorado River cutthroat trout

	Alternative A	Alternative F	Alternative G
Total miles	586	531	466
Total road density	0.64	0.58	0.51
Miles removed (compared to Alt. A)	n/a	55	120
% of miles removed (compared to Alt. A)	n/a	9%	20%

The total miles of roads and trails by use within 350 feet of known occupied cutthroat habitat are presented in Table BE-24. These include all cutthroat trout regardless of genetic purity. In total, motorized uses decrease slightly adjacent to occupied cutthroat trout habitat for alternative G and do not change at all in alternative F. In alternative G, the level of use is reduced along 10 miles of travelway within 350 feet of occupied cutthroat stream and it is eliminated along another 10 miles. Roads would be decommissioned where travel has been eliminated. In most cases, motorized use is removed along cutthroat streams in alternative G with three exceptions. Two-tenths of a mile of road are added within 350 feet of Indiana Creek, almost a half mile is added in the Upper Main Elk watershed, and about a tenth of a mile of new ATV trail is added

along Fawn Creek (presumably a crossing). While in general, reduction of motorized use adjacent to occupied cutthroat streams has a positive long-term effect, negative effects are expected in the three populations discussed above.

Table BE-24. Miles of travelways by use type within 350 feet of occupied cutthroat habitat

Type of use	Alternative A	Alternative F	Alternative G
Full sized vehicle miles	47.1	47.1	40.2
ATV miles	7.5	7.5	7.8
Motorcycle miles	7.2	7.2	3.7
Mountain bike miles	28.8	28.8	18.9
Foot and horse miles	73.7	73.7	83.7

The category listed is the "highest" use allowed on the route. For example, mountain bike routes usually allow foot and horse, but not motorcycles, ATV's, or full size vehicles.

Determination

Total road density in subwatersheds containing at least one conservation population of Colorado River cutthroat trout is either maintained or reduced in all but one watershed (in alternative G), which would have a long-term beneficial impact on cutthroat trout. Motorized routes are added within 350 of occupied cutthroat trout habitat in three watersheds in alternative G. A total of 10 miles of travelway within 350 feet of occupied cutthroat habitat would be removed in alternative G. Decommissioning and rehabilitation of these routes may have adverse impacts in the short-term. Because of short-term impacts from decommissioning and the increase in localized roads and trails, all action alternatives **MAY IMPACT INDIVIDUALS, BUT ARE NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE**.

Roundtail Chub

The dominant risk factors contributing to the decline of roundtail chub are exotic predatory fishes, loss of suitable habitat (primarily due to impoundments and dewatering), conversion of warm-water habitat to cold-water habitat (e.g., below bottom-release reservoirs), and other alterations of the hydrologic regime. White River National Forest activities have limited potential to impact spawning success and general habitat availability for roundtail chub. Spawning success can be affected by allowing activities that change the timing of spring runoff. Delaying spring runoff keeps water temperatures cooler longer that could delay spawning or reduce spawning success. Forest activities that deplete water directly reduce the volume of habitat available downstream.

Roundtail chub are known to occur downstream of two streams with uplands within the White River National Forest, Divide Creek and Milk Creek. Limited data indicate that this species occurs a significant distance away from the Forest, perhaps more than 10 miles downstream. The analysis for this species included the miles of road by alternative within occupied watersheds. Road densities are low (less than one mile per square mile) on National Forest Lands in both of the occupied watersheds (Table BE-25). Road density is lower in all action alternative and lowest overall in alternative G. No roundtail chub habitat is directly affected since the species does not occur on the forest. Roundtail chub are not known to be sensitive to sediment and prefer turbid conditions.

Table BE-25. Differences in road mileage and density among alternatives in watersheds upstream of occupied roundtail chub habitat

Watershed name	Alternative A Miles (density)	Alternative F Miles (density)	Alternative G Miles (density)
Divide Creek	75 (0.69)	59 (0.55)	52 (0.48)
Milk Creek	21 (0.63)	19 (0.56)	20 (0.58)

Density = miles per square mile

Determination

Since no direct habitat changes will result from the proposed action, road densities in the occupied watersheds are low in all alternatives, and that this species is not known to be sensitive to sediment, the determination for all alternatives is **NO IMPACT**.

Bluehead Sucker

The bluehead sucker (*Catostomus discobulus)* was not covered by the BE for the forest plan. Bluehead sucker is found in moderate to fast velocity water in a wide variety of stream sizes. Bluehead suckers feed on algae, invertebrates, and other material scraped from stones and rocks. According to the Colorado Division of Wildlife native fish GIS layer, bluehead sucker occur in the Colorado River and Milk, Piceance, East and West Rifle, Alkali, and Divide creeks. Bluehead sucker have recently been documented in West Divide Creek and near the mouth of Willow Creek (a tributary to West Divide).

Bluehead sucker are known to occur downstream of the Forest in four drainages and on the WRNF in the West Divide watershed. The analysis for this species included the miles of road by alternative within occupied watersheds. Road densities are generally low on National Forest Lands in all occupied drainages (Table BE-26). Road densities drop significantly in the Divide Creek watershed. While this reduction in road density would improve watershed conditions in bluehead sucker habitat, the disturbance associated with road decommissioning could impact occupied habitat although bluehead sucker are not known to be sensitive to sediment and tolerate very turbid conditions in the Colorado River.

Table BE-26. Differences in road mileage and density among alternatives in watersheds upstream of occupied bluehead sucker habitat

Watershed name	Alternative A Miles (density)	Alternative F Miles (density)	Alternative G Miles (density)
Rifle Creek	49 (1.11)	47 (1.07)	51 (1.16)
Divide Creek	75 (0.69)	59 (0.55)	52 (0.48)
*West Divide	*48 (0.67)*	*39 (0.54)*	*34 (0.48)*
Milk Creek	21 (0.63)	19 (0.56)	20 (0.58)
Piceance Creek	1.5 (2.13)	1.5 (2.13)	1.5 (2.13)

** The West Divide watersheds are a subset of the Divide Creek watershed, but contain occupied bluehead sucker habitat on the WRNF (Alkali Subwatershed was excluded).*

Density = miles per square mile

Determination

In the three watersheds were bluehead sucker only occur downstream of the forest, road density remains relatively stable in all alternatives. However, in the occupied watershed (West Divide Creek), road density drops considerably in both alternative F and G, with the greatest reduction in alternative G. Although bluehead sucker are not known to be sensitive to sediment, the amount of disturbance associated with road decommissioning

could still have negative impacts on the local population. The long-term impact to bluehead sucker from this reduction in road density is expected to be positive as the natural watershed function improves. The determination for the proposed action for all alternatives is **MAY IMPACT INDIVIDUALS, BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE**.

Flannelmouth sucker

The flannelmouth sucker (*Catostomus latipinnis)* was not covered by the BE for the forest plan. The flannelmouth sucker is restricted to larger streams and rivers in the middle and upper Colorado River drainage. Flannelmouth suckers are bottom feeders, feeding primarily on invertebrates. According to the Colorado Division of Wildlife native fish GIS layer, flannelmouth sucker occur in the Colorado River and Divide, Milk, and Piceance creeks. Although specific data is limited, it is believed that this species occurs downstream of the forest. Flannelmouth sucker have been documented in West Divide Creek about 7 miles downstream of the forest and were absent from a site sampled 2 miles downstream of the forest.

Flannelmouth sucker do not occur on the White River National Forest, but are known to occur downstream of the forest in three drainages. The analysis for this species included the miles of road by alternative within occupied watersheds. Road densities are low (less than one mile per square mile) on National Forest System lands in two occupied drainages (Table BE-27). The third occupied drainage has very limited area on the White River National Forest and the road density does not vary be alternative. No flannelmouth sucker habitat is directly affected since none occur on the forest. Flannelmouth sucker are not known to be sensitive to sediment and tolerate very turbid conditions in the Colorado River.

Table BE-27. Differences in road mileage and density among alternatives in watersheds upstream of occupied flannelmouth sucker habitat

Watershed name	No Action Miles (density)	Alternative F Miles (density)	Alternative G Miles (density)
Divide Creek	75 (0.69)	59 (0.55)	52 (0.48)
Milk Creek	21 (0.63)	19 (0.56)	20 (0.58)
Piceance Creek	1.5 (2.13)	1.5 (2.13)	1.5 (2.13)

Density = miles per square mile

Determination

Since no direct habitat changes will result from the proposed action, road densities in the occupied watersheds are low in all alternatives, and that this species is not known to be sensitive to sediment, the determination for all alternatives is **NO IMPACT**.

Mountain Sucker

The mountain sucker (*Catostomus platyrhynchus)* was not covered by the BE for the forest plan. The natural range of the mountain sucker is restricted to the mountainous regions of Western North America. The preferred habitat of this fish is usually clear, cold streams with clean rubble or sand bottoms. They are usually found in areas of undercut banks, eddies, small pools and in areas of moderate current (Woodling 1985). The mountain sucker is seldom found in lakes (Simpson and Wallace 1982). Growth is slow and sexual maturity is often reached when fish are 5 to 6 inches long. Males usually

become sexually mature in 2 to 3 years and females in 4 to 5 years. A fish 8 inches in length would be considered a large specimen. Spawning occurs in late spring or early summer in riffles of clear, swift streams. Its food consists almost entirely of algae, which is scraped from the rocks by means of the cartilaginous sheath on the jaws. Therefore, they would require more open streams such as in meadows versus closed canopy streams surrounded by coniferous forests. Primary threats include habitat alteration, specifically increased turbidity and sedimentation due to land management and irrigation practices, and introductions of nonnative fish. The Colorado Division of Wildlife GIS native fish layer shows Mountain sucker in 11 streams that cross the White River National Forest, most of which are located in the northeastern part of the forest. The location of the actual samples may or may not be within the Forest boundary. These streams include: Deer Creek, Morapos Creek, Milk Creek, Coal Creek, Beaver Creek, Fawn Creek, Piceance Creek, West Rifle Creek, Lost Creek, Deep Creek, and the North Fork White River.

The analysis for this species included the miles of road by alternative within occupied watersheds (Table BE-28). Road densities generally decrease in the action alternatives. Alternative G has the lowest road density. Road density does not change in two of the occupied watersheds. Mountain sucker are sensitive to sediment and turbidity, which may originate from the road system. Road crossings in occupied habitat may create barriers to mountain sucker movement. Little is known about the mountain sucker's ability to navigate culverts. Road decommissioning efforts may contribute sediment to occupied mountain sucker habitat, although in general the long-term effect of the action alternatives on mountain sucker is expected to be positive with the general road density reduction in occupied watersheds.

Table BE-28. Differences in road mileage and density among alternatives in watersheds upstream of occupied mountain sucker habitat

Watershed name	No Action Miles (density)	Alternative F Miles (density)	Alternative G Miles (density)
Deep Creek	47 (1.29)	46 (1.25)	26 (0.71)
West Rifle Cr	21 (1.09)	21 (1.09)	24 (1.21)
Morapos Creek	0.9 (0.09)	0.9 (0.09)	0.9 (0.09)
Deer Creek	0 (0)	0 (0)	0 (0)
Milk Creek	21 (0.63)	19 (0.56)	20 (0.58)
NF White River	80 (0.33)	80 (0.33)	76 (0.31)
*Fawn Cr	20 (1.11)	20 (1.11)	19 (1.03)
*Lost Cr	14 (0.66)	14 (0.66)	13 (0.61)
Flag Creek	13 (1.29)	13 (1.29)	12 (1.17)
Coal Creek	17 (2.25)	16 (2.11)	15 (1.97)
Big Beaver Cr	25 (1.04)	25 (1.04)	22 (0.91)
Piceance Creek	1.5 (2.13)	1.5 (2.13)	1.5 (2.13)

Density = miles per square mile

** Fawn and Lost creeks are also included in the North Fork White River total, but each is believed to contain mountain suckers.*

Determination

In general, the miles of road in watersheds occupied by mountain sucker are decreasing in all action alternatives. Mountain sucker may be sensitive to sediment generated from

road decommissioning efforts. This reduction in disturbance is expected to be beneficial to mountain sucker as the roads are reclaimed and their watershed impacts are reduced. Alternative G removes the most roads from occupied mountain sucker watersheds. The determination for the proposed action for all alternatives is **MAY IMPACT INDIVIDUALS, BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE**.

Plants

The analyses used represents habitat types where plants could be likely found.

Seapink

Seapink (*Armeria maritima* ssp. *sibirica),* is discussed in the BE for the forest plan, under the taxonomic designation *Armeria scabra* ssp. s*ibirica*; that BE contains more detailed information (USDA Forest Service/WRNF 2002a). (This species, under the taxonomic designation *Armeria scabra* ssp. s*ibirica,* is discussed in the BE for the Forest Plan.) Please refer to the BE prepared for the forest plan for more detailed information. Since the BE was completed, additional taxonomic discussion on this species has occurred and many botanists believe that *Armeria scabra* ssp. s*ibirica* is the same species as *Armeria maritima* ssp. *sibirica* or *A. maritima* ssp. *labradorica* (Johnston 2000, December 18). That is the convention followed in this analysis.

There are three populations known of this species in Colorado; two of them are on this forest and another small one nearby on the Pike National Forest. Besides an apparent recent discovery in northern Utah, the closest populations are in Alaska. In Colorado, the species is known only from three sites in Summit and Park Counties, all in alpine areas on well-vegetated, gentle tundra slopes. Barry Johnston, botanist on the GMUG, has counted all three Colorado populations, and the total number of individuals in Colorado is fewer than 500. Population size varies from about 25 to 325 and elevation ranges from 11,800 feet to 12,500. There are two known locations for this species on the WRNF. One is in the Hoosier Ridge Research Natural Area, affording it protection from motorized and mechanized vehicles. There are no established trails within the Research Natural Area. A few hikers per year probably cross this *Armeria* site. The other site is currently within 100 yards of an open four-wheel-drive road (Johnston 2000, December 18). The Forest Plan directs all traffic to remain on established travel ways. However, it is currently open for snowmobiles for winter use.

Table BE-29. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

**Approximately 474 square miles of potential habitat were analyzed for these areas.*

Within alpine habitats, Alternative G decreases motorized, mechanized, motorized/mechanized and foot/horse use. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

Determination

The forest plan provides management area direction that will reduce potential impacts to this species from human recreation use. However, given the increasing level of human activity near known locations, the ease of circumventing barriers for vehicles, and people's propensity to wander off established trails, there is a continuing possibility of human impact to the habitat for this species. This human use may result in some level of disturbance to individuals or populations. The determination under any of the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF *ARMERIA MARITIMA* SSP. *SIBIRICA*, BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This is following the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and any new projects will include site specific analysis.

Park Milkvetch

The park milkvetch (*Astragalus leptaleus)* was not covered by the BE for the forest plan. The habitat of park milkvetch is characterized as being the mesic ecotone between saturated riparian communities and dry, upland sagebrush-steppe. This ecotone can occur on the tops and sides of hummocks and the dry fringe of Geyer's willow and bluegrass or graminoid-dominated communities at 6500 to 9500 feet. The substrate is loamy, mineral soil that dries late in the summer season, but remains somewhat moist just below the surface. The species has a bimodal distribution, with populations reported in Idaho and western Montana as well as Colorado and Wyoming (Moseley 1991). In the last two states, it is a wetland species that occupies sedge-grass meadows, swales and hummocks, and is also present among streamside willows (Hu 1999). Habitat is more or less flat and open, although park milkvetch sometimes occurs in the partial shade of Geyer's willow and occasionally Booth's willow (Moseley 1991). One known location on the White River National Forest is below the Green Mountain Reservoir. Known threats to this species come from grazing, as it is palatable, and conversion of the ecotone to hay production (Coles 2002).

Table BE-30. Comparison of travelway densities by alternative for lands within riparian habitat on the White River National Forest

	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	1.03	1.03	0.91
Mechanized	0.52	0.52	0.44
Mot/mech	1.55	1.55	1.35
Foot/horse	0.96	0.96	1.00
Total	2.51	2.51	2.35
Scheduled for Decommission (reduction in density)	0.00	0.39	0.52

Approximately 91 square miles of potential habitat were analyzed for this species.

Within riparian habitats, alternative G decreases motorized, mechanized, and motorized/mechanized mix use. Alterative G increases foot/horse traffic from 0.96 (miles/square mile) to 1.0. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

The forest plan provides direction that includes significant protection for riparian areas, which would be the primary habitat for this species on the White River National Forest. This direction includes watershed conservation practices (WCP) direction, riparian protection standards and guidelines for grazing, and standards for protection of sensitive species and their habitats (USDA Forest Service/WRNF 2002a).

Determination

Forest plan riparian direction combined with lack of habitat alterations under any alternatives indicate a low likelihood of detrimental impacts on this species. There is some opportunity for damage to existing habitat through grazing or recreation activities. For this reason, the determination under all the alternatives is **MAY IMPACT INDIVIDUALS OF *ASTRAGALUS LEPTALEUS* BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Wetherill Milkvetch

The Wetherill milkvetch (*Astragalus wetherillii)* was not covered by the BE for the forest plan. Wetherill milkvetch is a narrowly restricted endemic species from the Colorado Plateau, occurring on eroding shale bluffs in only a few counties (Garfield, Mesa, Moffat, Montezuma, San Miguel, and Ouray) on Colorado's western slope. Available habitat supports geographically isolated populations, offering little opportunity for interbreeding among distant populations. The known populations are discontinuous over a 160 mile north-south band, with distances ranging to several miles between occurrences (Gindele 2002). While eroding shale-sandstone shrub steppe and woodland habitats are common, the plants occupy a small fraction of the apparent potential habitat. Just over three dozen populations are recorded and they range in numbers of individuals from just a couple of plants to a few hundred. The total estimated number of individuals remains relatively small, estimated at between 6,000 and 9,000 in a given year (Gindele 2002). A small percentage occurs on National Forest System land.

Available suitable habitat is at risk from planned increases in oil and gas exploration throughout the range of Wetherill milkvetch. The entire known habitat for this species is subject to a variety of planned and ongoing site-altering disturbances (Gindele 2002). There are two community types that this species can occupy—shrublands and sagebrush.

Table BE-31. Travelway densities by alternative for lands within the shrubland communities on the White River National Forest

s	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	0.99	0.99	0.85
Mechanized	0.27	0.27	0.18
Mot/mech	1.26	1.26	1.03
Foot/horse	0.33	0.33	0.41
Total	1.59	1.59	1.44
Scheduled for Decommission (reduction in density)	0.58	0.33	0.44

Approximately 434 square miles of potential habitat were analyzed for these species.

For shrubland communities that would support associated populations, in alternative G there is a decrease in motorized, mechanized, and motorized/mechanized mix. In Alternative G there is an increase in foot/horse traffic from 0.33 miles/square mile to 0.41 miles/square mile. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Table BE-32. Travelway densities by alternative for lands within the sagebrush communities on the White River National Forest

	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	1.64	1.64	1.28
Mechanized	0.27	0.27	0.18
Mot/mech	1.91	1.91	1.47
Foot/horse	0.29	0.29	0.38
Total	2.20	2.20	1.85
Scheduled for Decommission (reduction in density)	0.00	0.49	0.75

Approximately 73 square miles of potential habitat were analyzed for these species.

Within sagebrush habitat, in alternative G there is a decrease in motorized, mechanized, and motorized/mechanized mix. In alternative G there is an increase in foot/horse traffic from 0.33 miles/square mile to 0.41 miles/square mile. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Determination

The forest plan prohibition of off-road travel, combined with lack of habitat alterations under any alternative, indicate a low likelihood of detrimental impacts on this species from any alternative. There is some opportunity for damage to existing habitat through grazing, recreation activities, or oil and gas exploration. For this reason, the determination under all the alternatives is **MAY IMPACT INDIVIDUALS OF *ASTRAGALUS WETHERILLI* BUT IS NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only

ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Arctic Braya

Arctic braya (*Braya glabella)* is discussed in the BE for the forest plan; life history and other general information on this species can be found in that document (USDA Forest Service/WRNF 2002a). Arctic braya is a circumpolar, boreal species, with a widespread distribution in the Canadian Rocky Mountains, northern Canada, and northern and central Alaska (Aiken et al. 2003). This species is extremely variable among populations and there is considerable taxonomic discussion on *Braya* species (Aiken 2003). It is known to occur on the White River National Forest on the boundary between Summit and Park counties and Pitkin and Gunnison Counties in the Taylor Pass area. It occupies calcareous substrates, especially Leadville limestone, sparsely vegetated slopes above timberline with fine gravels, or disturbed sites associated with inactive mines at elevations of 12,000–13,000 feet (Spackman et al. 1999).

Direct impacts on *Braya glabella* or its habitat would not be significant (USDA Forest Service/WRNF 2002b). Summer travel in this area is restricted to designated routes, and there are no designated routes in or near populations. Winter travel is restricted to a corridor over Taylor Pass. None of the braya populations in this area are below or close to designated motor vehicle routes and none are close to areas grazed by livestock (USDA Forest Service/WRNF 2002b). Over time, the populations will likely come under increasing threats from unauthorized vehicle use, since recreational vehicle pressure is increasing throughout the White River National Forest. The probability of damage events from unauthorized vehicle use is increasing, and the damage would be cumulative and lead to degradation of the populations and their habitat (USDA Forest Service/WRNF 2002b).

Table BE-33. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

Approximately 474 square miles of potential habitat were analyzed for these areas.

Within alpine habitats, Alternative G decreases motorized, mechanized, motorized/mechanized and foot/horse use. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

Determination

The forest plan provides management area direction that will reduce potential impacts to this species from human recreation use. Current travel restrictions should provide some protection. However, given the increasing level of human activity near known locations

and people's propensity to wander off established trails, there is a continuing possibility of human impact on the habitat for this species. This human use may result in some level of disturbance to individuals or populations. The determination under any of the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF BRAYA GLABELLA OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Lesser-panicled Sedge

The lesser-panicled sedge (*Carex diandra)* was not covered by the BE for the forest plan. The lesser-panicled sedge exists on floating and non-floating moss mats, pond edges, and hummocks in open shrub and sedge meadows at 6,100 to 8,600 feet. The species is circumpolar; in North America, it is found from Newfoundland to the Yukon and south to New Jersey, Indiana, Colorado, and California (Keinath, Heidel, and Beauvais 2003). In Colorado and Wyoming, it is found on calcareous subalpine fens and bogs. This species may be threatened by trampling, grazing, and development of wetland habitats (Handley et al. 2002). Observations of Nebraska populations indicate that wetness of preferred habitat discourages grazing by domestic livestock (Steinauer 2002). On the White River National Forest, *Carex diandra* has been located in Garfield County, within the Flat Tops Wilderness.

Table BE-34. Comparison of travelway densities by alternative for lands within potential riparian habitat on the White River National Forest

	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	1.03	1.03	0.91
Mechanized	0.52	0.52	0.44
Mot/mech	1.55	1.55	1.35
Foot/horse	0.96	0.96	1.00
Total	2.51	2.51	2.35
Scheduled for Decommission (reduction in density)	0.00	0.39	0.52

Approximately 91 square miles of potential habitat were analyzed for this species.

Within riparian habitats, alternative G decreases motorized, mechanized, and motorized/mechanized mix use. Alterative G increases foot/horse traffic from 0.96 (miles/square mile) to 1.0. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

The forest plan provides direction that includes significant protection for riparian areas, which would be the primary habitat for this species on the White River National Forest. This direction includes watershed conservation practices (WCP) direction, riparian protection standards and guidelines for grazing, and standards for protection of sensitive species and their habitats (USDA Forest Service/WRNF 2002a).

Determination

The forest plan provides management area direction that will reduce potential impacts on this species because its known locations on the White River National Forest are in a wilderness area where motorized travel is prohibited. Current known locations are outside any trail travel zone and the very wet conditions at high elevation preclude new trail location or construction. However, given the increasing level of human activity near known locations and people's propensity to wander off established trails, there is a possibility of human impact on the habitat for this species. This human use may result in some level of disturbance to individuals or populations. The determination under all the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF CAREX DIANDRA OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Rocky Mountain Thistle

The Rocky Mountain thistle (*Cirsium perplexans)* was not covered by the BE for the forest plan. The global distribution of Rocky Mountain thistle is limited to western Colorado, in the Colorado and Gunnison river valleys (Weber and Wittmann 2001). It has been reported from Delta, Garfield, Mesa, Montrose, and Ouray counties (Panjabi and Anderson 2004). Most known occurrences are in Montrose County, and the largest occurrence, with thousands of individuals, is in Delta County, at Cedar Mesa (Panjabi and Anderson 2004). All occurrences are found within an approximately 10- x 80-mile area that runs north to south from Garfield County in the north to Ouray County in the south at elevations of 5,800 to 8,060 feet. *Cirsium perplexans* is found almost exclusively on clay soils or "adobe hills" (Weber and Wittmann 2001) that are derived from shales of the Mancos or Wasatch formations (Panjabi and Anderson 2004).

Rocky Mountain thistle is found on barren adobe soils and has been documented within four primary vegetation types, all low elevation, relatively dry sites. Speculative threats to *Cirsium perplexans* include the use of biological control and herbicides to manage populations of non-native thistles, human recreational activities, non-native species invasion, and road construction (Panjabi and Anderson 2004). This species habitat occurs in sagebrush, shrubland, and pinyon-juniper habitats.

Table BE-35. Travelway densities by alternative for lands within the shrubland communities on the White River National Forest

Type of Use	Density (miles/square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.99	0.99	0.85
Mechanized	0.27	0.27	0.18
Mot/mech	1.26	1.26	1.03
Foot/horse	0.33	0.33	0.41
Total	1.59	1.59	1.44
Scheduled for Decommission (reduction in density)	0.58	0.33	0.44

Approximately 434 square miles of potential habitat were analyzed for these species.

For shrubland communities that would support associated populations, in alternative G there is a decrease in motorized, mechanized, and motorized/mechanized mix. In Alternative G there is an increase in foot/horse traffic from 0.33 miles/square mile to 0.41 miles/square mile. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Table BE-36. Travelway densities by alternative for lands within the sagebrush communities on the White River National Forest

Type of Use	Density (miles/square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	1.64	1.64	1.28
Mechanized	0.27	0.27	0.18
Mot/mech	1.91	1.91	1.47
Foot/horse	0.29	0.29	0.38
Total	2.20	2.20	1.85
Scheduled for Decommission (reduction in density)	0.00	0.49	0.75

Approximately 73 square miles of potential habitat were analyzed for these species.

Within sagebrush habitat, in alternative G there is a decrease in motorized, mechanized, and motorized/mechanized mix. In alternative G there is an increase in foot/horse traffic from 0.33 miles/square mile to 0.41 miles/square mile. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Table BE-37. Travelway densities by alternative for lands within pinyon-juniper stands on the White River National Forest

Type of Use	Density (miles/square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.33	0.33	0.27
Mechanized	0.08	0.08	0.05
Mot/mech	0.41	0.41	0.31
Foot/horse	0.03	0.03	0.09
Total	0.44	0.44	0.40
Scheduled for Decommission (reduction in density)	0.00	0.04	0.07

Approximately 33 square miles of potential habitat were analyzed for this species.

In alternative G motorized, mechanized and motorized mechanized mix will decrease in use. Foot/horse traffic will increase in alternative G from 0.03 miles/square mile to 0.09 miles/square mile. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Determination

The forest plan provides management area direction that will reduce potential impacts on this species because motorized travel is prohibited off established travelways. Given the increasing level of human activity near known locations and people's propensity to wander off established trails, however, there is a possibility of human impact to the habitat for this species. This human use may result in some level of disturbance to individuals or populations. The determination under all the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF *CIRSIUM PERPLEXANS* OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Yellow lady's-slipper

Yellow lady's-slipper (*Cypripedium parviflorum)* was not covered in the forest plan BE. Region 2 harbors an outlying southwestern portion of Yellow Lady's-slipper distribution. It occurs in all states within Region 2. In Colorado, this taxon appears to be scattered along the Front Range, with a few location on the San Juan National Forest. It has been found on an administrative site on the White River National Forest within the Roaring Fork Valley. The species appears to occupy a wide array of habitats throughout its range, from bogs, fens, marshes, and wooded swamps, to mesic grasslands, to well-drained sites in woodlands and open deciduous forests at about 1000 feet in east Kansas, to montane aspen groves and ponderosa pine forests at about 8000 feet in Colorado. Within the Roaring Fork Valley, it is found within riparian areas that contain cottonwood, and conifer trees at about 6000 ft. in elevation. It is often found on rocky, silty, or sandy, alkaline or subalkaline soils (Morse 2001). Cypripedium species tend to be early successional, populations colonize relatively open sites and decline in size as forests

mature. As with other relatively rare species, there is some conflicting information regarding the taxonomy of this species. The accepted name of this species is C. parviflorum and all varieties of this species are now considered synonyms. The yellow lady's slipper orchid is found in the spruce-fir zone in R2 (McKee 2002, September 24).

Table BE-38. Comparison of travelway densities by alternative for lands within potential riparian habitat on the White River National Forest

	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	1.03	1.03	0.91
Mechanized	0.52	0.52	0.44
Mot/mech	1.55	1.55	1.35
Foot/horse	0.96	0.96	1.00
Total	2.51	2.51	2.35
Scheduled for Decommission (reduction in density)	0	0.39	0.52

Approximately 91 square miles of potential habitat were analyzed for this species.

Within riparian habitats, alternative G decreases motorized, mechanized, and motorized/mechanized mix use. Alterative G increases foot/horse traffic from 0.96 (miles/square mile) to 1.0. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

The forest plan provides direction that includes significant protection for riparian areas, which would be the primary habitat for this species on the White River National Forest. This direction includes watershed conservation practices (WCP) direction, riparian protection standards and guidelines for grazing, and standards for protection of sensitive species and their habitats (USDA Forest Service/WRNF 2002a).

The forest plan provides management area direction that will reduce potential impacts on this species because its known locations on the White River National Forest are in a wilderness area where motorized travel is prohibited. Current known locations are outside any trail travel zone and the very wet conditions at high elevation preclude new trail location or construction. However, given the increasing level of human activity near known locations and people's propensity to wander off established trails, there is a possibility of human impact on the habitat for this species. This human use may result in some level of disturbance to individuals or populations. The determination under all the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF CAREX DIANDRA OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**

Clawless Draba

The clawless draba (*Draba exunguiculata)* was not covered by the BE for the forest plan. The clawless draba is endemic to high elevations in the Rocky Mountains of Colorado, from 11,700 to 14,000 feet. The relatively inaccessible nature of much of the habitat suggests that only a small portion of potential habitat has been affected historically. It appears to be most abundant within the region around Gray's Peak. More than 75 percent of the known occurrences are on land managed by the USDA Forest Service. Although some populations have been affected in areas with high recreational use, current available information suggests that several populations are relatively secure because they occur in

areas that are afforded protection either by land use designation (such as wilderness areas) or by their remote, relatively inaccessible location (Ladyman 2004a). Weber and Wittmann (2001) commented that the clawless draba is "occasional" in alpine fell fields. The species grows in small patches and occurrence size typically ranges from 3 isolated individuals to several patches composed of a total of 20 or more individuals over 0.1 acre. Population size seems very variable. Although the species is uncommon, it appears that current abundance is large enough that occasional human intervention is not likely to lead to rapid extinction; however, in combination with highly variable environmental factors, such random human influences could pose a threat.

The population may be centered in a very limited area. Observations indicate some plants have been trampled in several areas that receive high use by hikers. If these areas are centers of high population density, suitable habitat may be unduly compromised. Mining activities are likely to have affected populations that are observed in the vicinity of existing mines. Undisciplined hiking and excessive widening of existing trails are recognized as being problems for the maintenance of undisturbed habitat in the high mountains of Colorado (Ladyman 2004a).

Table BE-39. Travelway densities by alternative for lands within the alpine willow communities on the White River National Forest

	Density (miles/square mile)		
Type of Use	**Alternative A**	**Alternative F**	**Alternative G**
Motorized	0.15	0.15	0.15
Mechanized	0.14	0.14	0.15
Mot/mech	0.30	0.30	0.30
Foot/horse	0.41	0.41	0.47
Total	0.71	0.71	0.77
Scheduled for Decommission (reduction in density)	0	0.18	0.12

Approximately 51 square miles of potential habitat were analyzed for these species.

In alternative G there is no change in motorized and motorized/mechanized mix. In this alternative there is an increase in mechanized (0.14 to 0.15 miles/square miles) and foot/horse (0.41 to 0.47miles/square mile) use. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Determination

The forest plan provides management area direction that will reduce potential impacts to this species from human recreation use. Current travel restrictions should provide some protection. However, given the increasing level of human activity near known locations and people's propensity to wander off established trails, there is a continuing possibility of human impact on the habitat for this species. This human use may result in some level of disturbance to individuals or populations. The determination under all the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF *DRABA EXUNGUICULATA* OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine

maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Gray's Peak Whitlow-grass

The Gray's Peak whitlow-grass *(Draba grayana)* was not covered by the BE for the forest plan. The Gray's Peak whitlow-grass is endemic to high elevations in the Rocky Mountains of Colorado, from 11,500 to 14,000 feet. This species has been reported from approximately 28 locations, most within 4 miles of Gray's Peak and most (25 of 28 occurrences) on National Forest System land. Population size is typically small, with 10 to 30 plants. Specific threats have been identified, including impacts of recreation (hiking and mountain biking) and mountain goats (Ladyman 2004b).

Recreational use of habitat, such as foot traffic, poses a threat to some occurrences of Gray's Peak whitlow-grass, particularly those on land managed by the USDA Forest Service. The impacts may become substantially more significant as the human population grows in areas within easy access to *Draba grayana* habitat and as recreational use increases. Mining activities are not perceived to be a current threat to any of the known occurrences of this species, although individual occurrences may have been affected in the past. Mountain goats have a negative impact on the habitat for this species in some parts of its range. Invasive weeds may pose an additional risk to its long-term sustainability. Current information suggests that many occurrences of Gray's Peak whitlow-grass are relatively secure because of their remote, relatively inaccessible location (Ladyman 2004b).

Table BE-40. Travelway densities by alternative for lands within the alpine willow communities on the White River National Forest

	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	0.15	0.15	0.15
Mechanized	0.14	0.14	0.15
Mot/mech	0.30	0.30	0.30
Foot/horse	0.41	0.41	0.47
Total	0.71	0.71	0.77
Scheduled for Decommission (reduction in density)	0.00	0.18	0.12

Approximately 51 square miles of potential habitat were analyzed for these species.

In alternative G there is no change in motorized and motorized/mechanized mix. In this alternative there is an increase in mechanized (0.14 to 0.15 miles/square miles) and foot/horse (0.41 to 0.47miles/square mile) use. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Determination

The forest plan provides management area direction that will reduce potential impacts to this species from human recreation use. Current travel restrictions should provide some protection. However, given the increasing level of human activity near known locations and people's propensity to wander off established trails, there is a continuing possibility of human impact on the habitat for this species. This human use may result in some level of disturbance to individuals or populations. The determination under any of the

alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF *DRABA GRAYANA* OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Altai Cottongrass

Altai cottongrass (*Eriophorum altaicum* var. *neogaeum)* is discussed in the BE for the forest plan; that document provides life history and other general information (USDA Forest Service/WRNF 2002a). *Eriophorum altaicum* var. *neogaeum* is a species of wetlands in the Rocky Mountains, Alaska, and northeastern Asia. Taxonomic botanists disagree about whether this species should be called *Eriophorum altaicum* or *E. scheuchzeri*. It is known from high mountains in Colorado, Utah, Wyoming, Montana; the Rocky Mountains of Canada; and places in Alaska and northeastern Asia. On the White River National Forest, *Eriophorum altaicum* var. *neogaeum* is known from three or four sites; two of these sites are close together southeast of Aspen and the other two are a few miles apart in southeastern Eagle County and northeastern Pitkin County. The total known White River National Forest population is fewer than 500 individuals (Johnson 2001a). In Colorado, this species is always associated with water-saturated soils. Individuals grow in bogs, fens, wetlands, and along very wet streamsides (Ladyman 2004c). Elevations range from 10,500 to 12,600 feet, averaging 12,260 feet, which represents the higher elevations in southern Colorado. Sites are often in the upper subalpine zone (Spackman et al. 1999).

Suitable habitat for the Altai cottongrass is not likely to be affected by travel management activities. In general, fen habitats are avoided by roads or trails. Off-route motorized and mechanized use is not allowed in the spring-fall use period. However, wetland habitats are very sensitive to human and animal use. In winter there is still some damage resulting from vehicle use or people entering the wetland area, even above deep snow (Kaeding and Olliff et al. 1999). All known locations, except one, are in wilderness areas. The one excepted site is in an area proposed for wilderness designation. Even though many of these sites are in wilderness, the habitat is extremely sensitive to human use, especially travel nearby and uses that create changes in water or air quality.

Table BE-41. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

Approximately 474 square miles of potential habitat were analyzed for these areas.

Within alpine habitats, alternative G decreases motorized, mechanized, motorized/mechanized and foot/horse use. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

Table BE-42. Comparison of travelway densities by alternative for lands within potential riparian habitat on the White River National Forest

	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	1.03	1.03	0.91
Mechanized	0.52	0.52	0.44
Mot/mech	1.55	1.55	1.35
Foot/horse	0.96	0.96	1.00
Total	2.51	2.51	2.35
Scheduled for Decommission (reduction in density)	0.00	0.39	0.52

Approximately 91 square miles of potential habitat were analyzed for this species.

Within riparian habitats, alternative G decreases motorized, mechanized, and motorized/mechanized mix use. Alterative G increases foot/horse traffic from 0.96 (miles/square mile) to 1.0. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

The forest plan provides direction that includes significant protection for riparian areas, which would be the primary habitat for this species on the White River National Forest. This direction includes watershed conservation practices (WCP) direction, riparian protection standards and guidelines for grazing, and standards for protection of sensitive species and their habitats (USDA Forest Service/WRNF 2002a).

Determination

Altai cottongrass occupies very wet conditions at high elevations, which generally are avoided for road or trail location. All alternatives include restrictions for all motorized and mechanized travel to occur only on designated routes. Because of the sensitivity of the habitat, the determination under any of the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF ERIOPHORUM ALTAICUM VAR. NEOGAEUM BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Russet cottongrass

The Russet cottongrass (*Eriophorum chamissonis)* was not covered by the BE for the forest plan. Russet cottongrass is a circumpolar species, occurring in the low arctic. Its range in the Canadian Arctic Archipelago is limited. Russet cottongrass is known from eastern Siberia to Newfoundland, south to Minnesota, northern Wyoming, Colorado, and Oregon. In Wyoming, russet cottongrass occurs in the Absaroka and Bighorn ranges in

Park and Sheridan counties on the Bighorn and Shoshone national forests. A recent floristic survey in central Colorado suggests that several populations may occur in the Holy Cross Wilderness area at elevations to 10,840 feet. By contrast, in Wyoming russet cottongrass is found in montane swamps and bogs at 7,350 to 8,320 feet. According to CNHP, three sites occur on the White River National Forest, besides the 1934 site found by R. Hartman and E. Holt (CNHP 2003Hartman and Nelson 2001). *Eriophorum chamissonis* occupies imperfectly drained and silty substrates with high organic content found around the margins of ponds and marshes. The species has been reported in marshes with *Carex aquatilis* var. *stans* (Aiken et al. 1999).

Suitable habitat for the russet cottongrass is not likely to be affected by travel management activities. In general, very wet areas are avoided for roads or trails. Off-route motorized and mechanized use is not allowed in the spring-fall use period. However, wetland habitats are very sensitive to human and animal use. Even in winter there still is some damage resulting from vehicle use or people entering the wetland area, even above deep snow (Olliff et al. 1999). All known locations on the White River National Forest are in wilderness areas. Even though these sites are in wilderness, the habitat is extremely sensitive to human use, especially travel nearby and changes in water or air quality.

Table BE-43. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

Approximately 474 square miles of potential habitat were analyzed for these areas.

Within alpine habitats, alternative G decreases motorized, mechanized, motorized/mechanized and foot/horse use. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

Table BE-44. Comparison of travelway densities by alternative for lands within potential riparian habitat on the White River National Forest

Type of Use	Density (miles/square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	1.03	1.03	0.91
Mechanized	0.52	0.52	0.44
Mot/mech	1.55	1.55	1.35
Foot/horse	0.96	0.96	1.00
Total	2.51	2.51	2.35
Scheduled for Decommission (reduction in density)	0.00	0.39	0.52

Approximately 91 square miles of potential habitat were analyzed for this species.

Within riparian habitats, alternative G decreases motorized, mechanized, and motorized/mechanized mix use. Alterative G increases foot/horse traffic from 0.96 (miles/square mile) to 1.0. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

The forest plan provides direction that includes significant protection for riparian areas, which would be the primary habitat for this species on the White River National Forest. This direction includes watershed conservation practices (WCP) direction, riparian protection standards and guidelines for grazing, and standards for protection of sensitive species and their habitats (USDA Forest Service/WRNF 2002a).

Determination

In Colorado, russet cottongrass occupies very wet conditions at relatively high elevations, which are generally avoided for road or trail location. All alternatives include restrictions for all motorized and mechanized travel to occur only on designated routes. Because of the sensitivity of the habitat, the determination under any of the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF ERIOPHORUM CHAMISSONIS BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Slender Cottongrass

The Slender cottongrass (Eriophorum gracile) was not covered by the BE for the forest plan. Slender cottongrass often forms large uniform stands that are recognizable from a distance because of reddish leaf tips. This cottongrass occurs in fens, wet meadows, and pond edges at elevations of 8,100 to 12,000 feet (Spackman et al.1999). Slender cottongrass is a circumboreal species; in North America it occurs across Canada, south to Pennsylvania, Iowa, Colorado, Idaho, and central California (Ode 2001). This species has not been found on the White River National Forest, although it occurs on many surrounding forests.

Suitable habitat for the slender cottongrass is not likely to be affected by travel management activities. In general, very wet areas are avoided for roads or trails. Off-route motorized and mechanized use is not allowed in the spring–fall use period. However, wetland habitats are very sensitive to human and animal use. Even in winter some damage still can result from vehicle use or people entering the wetland area, even above deep snow (Olliff et al. 1999). There are no known locations of slender cottongrass on the White River National Forest.

Table BE-45. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

Approximately 474 square miles of potential habitat were analyzed for these areas.

Within alpine habitats, alternative G decreases motorized, mechanized, motorized/mechanized and foot/horse use. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

Table BE-46. Comparison of travelway densities by alternative for lands within potential riparian habitat on the White River National Forest

Type of Use	Density (miles/square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	1.03	1.03	0.91
Mechanized	0.52	0.52	0.44
Mot/mech	1.55	1.55	1.35
Foot/horse	0.96	0.96	1.00
Total	2.51	2.51	2.35
Scheduled for Decommission (reduction in density)	0.00	0.39	0.52

Approximately 91 square miles of potential habitat were analyzed for this species.

Within riparian habitats, alternative G decreases motorized, mechanized, and motorized/mechanized mix use. Alterative G increases foot/horse traffic from 0.96 (miles/square mile) to 1.0. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

The forest plan provides direction that includes significant protection for riparian areas, which would be the primary habitat for this species on the White River National Forest. This direction includes watershed conservation practices (WCP) direction, riparian protection standards and guidelines for grazing, and standards for protection of sensitive species and their habitats (USDA Forest Service/WRNF 2002a).

Determination

Slender cottongrass occupies very wet conditions at relatively high elevation (in Colorado), which are generally avoided for road or trail location. All alternatives include restrictions for all motorized and mechanized travel to occur only on designated routes. Because the species is not currently known to occur on the White River National Forest, the determination under any of the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF ERIOPHORUM GRACILE BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR**

CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE. This assumption is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Colorado Tansyaster

Colorado tansyaster (*Machaeranthera coloradoensis* var. *coloradoensis)* is discussed in the BE for the forest plan; that document (USDA Forest Service/WRNF 2002a) provides life history and other general information. *Machaeranthera coloradoensis* var. *coloradoensis* is a perennial, alpine species that is endemic to central and south-central Colorado and southern Wyoming. On the White River National Forest, two or three populations of *Machaeranthera coloradoensis* var. *coloradoensis* occur within a mile of each other, in the alpine zone south and west of Taylor Pass near the divide with Gunnison County and the Gunnison National Forest, at 12,200 to 12,600 feet elevation; it also has been known to occupy sites as low as 8,500 feet (Johnston 2001g). One of the White River National Forest populations has approximately 100 individuals. The total known White River National Forest population of Colorado tansyaster probably is between 300 and 2,500 individuals (Johnston 2001g). This species is a low-growing or prostrate mat plant with woody caudices. In Colorado, populations of *Machaeranthera coloradoensis* var. *coloradoensis* often are associated with limestone, dolomite, shale, or other calcareous substrates, often on gravelly places in the higher mountain parks, slopes, and rock outcrops up to dry tundra (Spackman et al. 1999).

Direct impacts on *Machaeranthera coloradoensis* var. *coloradoensis* or its habitat in the Taylor Pass area would not be significant (Johnston 2001g). Summer travel in this area is restricted to designated routes, and there are no designated routes in or near populations. Winter travel is restricted to a corridor over Taylor Pass. None of the populations in this area are below or close to designated motor vehicle routes and none are close to areas grazed by livestock or any national forest sources of air or water pollution. Over time, the populations will likely come under increasing threats from unauthorized vehicle use, because recreational vehicle pressure is increasing throughout the White River National Forest (Johnston 2001g). The probability of damage from unauthorized vehicle use is increasing, and the damage would be cumulative and lead to degradation of the populations and their habitats.

Table BE-47. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

Approximately 474 square miles of potential habitat were analyzed for these areas.

Within alpine habitats, alternative G decreases motorized, mechanized, motorized/mechanized and foot/horse use. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

Determination

The known population of Machaeranthera coloradoensis var. coloradoensis on the White River National Forest would be protected by travel management that would restrict vehicles to designated routes; there are no designated routes through or near Machaeranthera coloradoensis var. coloradoensis populations. The determination under all the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF MACHAERANTHERA COLORADOENSIS VAR. COLORADOENSIS OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Kotzebue's Grass-of-Parnassus

The Kotzebue's grass-of-parnassus (*Parnassia kotzebuei*) was not covered by the BE for the forest plan. The Forest Service Rocky Mountain Region (R2) harbors a southern Rocky Mountain segment of the distribution of Kotzebue's grass-of-parnassus. In northern Wyoming, this plant is found in the Absaroka and Bighorn mountains in Park and Johnson counties, on the Shoshone and Bighorn national forests. In Colorado, besides the White River National Forest, it is known from the Arapaho-Roosevelt, Grand Mesa, Uncompahgre, Gunnison, San Juan, and Pike-San Isabel national forests. In Wyoming, Kotzebue's grass-of-parnassus is commonly found at 9,400 to 11,200 feet elevation on moist seeps and grassy, wet tundra on thin clay soil, as well as on moist ledges below steep talus slopes (Heidel 2002b). Such moist habitats are discontinuous on the landscape, resulting in a patchy distribution. Outside R2, Kozebue's grass-of-parnassus is a circumboreal species that occurs from Alaska to Labrador and Greenland, extending south in the Rocky Mountains to Colorado and with a few locations to the west of the R2 border as far south as Nevada (Heidel 2002b).

There is one known location on White River National Forest of about 600 plants (Johnston 2001b). Wide fluctuations in number at the site have been noted: fewer than 40 plants in 1994 to more than 600 in 1997 (Johnston 2001b). This habitat is limited and can be highly subject to impacts; the habitat consists of riparian wetlands, with or without willows, and lake shores. The plant inhabits the higher elevations of 10,000 to 12,400 feet.

Table BE-48. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

Approximately 474 square miles of potential habitat were analyzed for these areas.

Within alpine habitats, alternative G decreases motorized, mechanized, motorized/mechanized and foot/horse use. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

Table BE-49. Comparison of travelway densities by alternative for lands within potential riparian habitat on the White River National Forest

Type of Use	Density (miles/square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	1.03	1.03	0.91
Mechanized	0.52	0.52	0.44
Mot/mech	1.55	1.55	1.35
Foot/horse	0.96	0.96	1.00
Total	2.51	2.51	2.35
Scheduled for Decommission (reduction in density)	0.00	0.39	0.52

Approximately 91 square miles of potential habitat were analyzed for this species.

Within riparian habitats, alternative G decreases motorized, mechanized, and motorized/mechanized mix use. Alterative G increases foot/horse traffic from 0.96 (miles/square mile) to 1.0. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

The forest plan provides direction that includes significant protection for riparian areas, which would be the primary habitat for this species on the White River National Forest. This direction includes watershed conservation practices (WCP) direction, riparian protection standards and guidelines for grazing, and standards for protection of sensitive species and their habitats (USDA Forest Service/WRNF 2002a).

Determination

In Colorado, Kotzebue's grass-of-parnassus occupies very wet conditions at relatively high elevation, which are generally avoided for road or trail location. All alternatives include restrictions for all motorized and mechanized travel to occur only on designated routes. Because the species is not currently known to occur on the White River National Forest, the determination under all the alternatives is **MAY IMPACT INDIVIDUALS of PARNASSIA KOTZEBUEI IF THEY EXIST ON THE WHITE RIVER NATIONAL FOREST BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO**

FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE. This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Harrington Beardtongue

Harrington beardtongue (*Penstemon harringtonii)* is discussed in the BE for the forest plan; that document (USDA Forest Service/WRNF 2002a) provides life history and other general information. *Penstemon harringtonii* is an endemic species, known only from west-central Colorado in sagebrush and desert shrub stands (Johnston 2001e). Its distribution covers most of the west half of Eagle County and areas in adjacent Garfield, Routt, and Grand counties. Around 50 known populations of *Penstemon harringtonii* have been described; most populations had 50 to 300 individuals. *Penstemon harringtonii* occurs within the White River National Forest boundary in four general areas: southeast of Eagle; northwest of Eagle; north of Edwards and Avon; and the Taylor Creek area, east of Basalt (Johnston 2001e). Elevations range from 6,800 to 8,400 feet. The plants are found on all exposures and mostly gentle slopes. Several recorded populations are partly in roadways or beside trails; however, usually the larger part of the population is outside the roadway or trail way (Johnston 2001e). *Penstemon harringtonii* apparently can establish on disturbed sites. In common with other *Penstemon* species, it can tolerate a mild to moderate degree of disturbance but not over a long time (Johnston 2001e). All four of the known occupied areas for *Penstemon harringtonii* on the White River National Forest are in elk and deer winter range; one of the four is also intensely used by motor vehicles and is located along a power line maintenance route.

Table BE-50. Travelway densities by alternative for lands within the sagebrush communities on the White River National Forest

	Density (miles/square mile)		
Type of Use	**Alternative A**	**Alternative F**	**Alternative G**
Motorized	1.64	1.64	1.28
Mechanized	0.27	0.27	0.18
Mot/mech	1.91	1.91	1.47
Foot/horse	0.29	0.29	0.38
Total	2.20	2.20	1.85
Scheduled for Decommission (reduction in density)	0.00	0.49	0.75

Approximately 73 square miles of potential habitat were analyzed for these species.

Within sagebrush habitat, in alternative G there is a decrease in motorized, mechanized, and motorized/mechanized mix. In alternative G there is an increase in foot/horse traffic from 0.33 miles/square mile to 0.41 miles/square mile. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Determination

Even though Harrington beardtongue is geographically restricted to west-central Colorado, many populations occur within this area, and some are large and healthy. Most populations are on Bureau of Land Management public lands, with some on private lands. A few of the populations could be affected by management on public land or the White River National Forest; however, the species as a whole has no significant viability concerns. The determination under all the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF PENSTEMON HARRINGTONII OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

De Beque Phacelia

DeBeque phacelia (*Phacelia scopulina* var. *submutica*) is discussed in the BE for the forest plan under the taxonomic designation *Phacelia submutica*; that document provides more detailed information (USDA Forest Service/WRNF 2002a). The species is known only from south-central Garfield and north-central Mesa Counties, Colorado. Its distribution in Colorado is several hundred miles away from the closest occurrences of other related Phacelia species (Johnston 2001d). Because *Phacelia scopulina* var. *submutica* is an annual plant, its populations tend to fluctuate widely from one year to the next, based on the timing and quantity of spring and early summer precipitation. Population sizes vary from 1 to 10,000 individuals and site areas vary from 1 to 150 acres. Most sites are less than 1 acre, corresponding to patches of the hardpan clay on which *Phacelia scopulina* var. *submutica* grows (Johnston 2001d). On the White River National Forest, the three known populations of *Phacelia scopulina* var. *submutica* have been counted at more than 1,700, more than 2,500, and 50 individuals. The total known White River National Forest population is probably around 5,000 (Johnston 2001d). One of the populations is shared with public land managed by the BLM.

Phacelia scopulina var. *submutica* occur on nearly barren patches within flats and slopes. These brown clay patches are barren because there is a hard clay layer about 3 to 4 inches below the surface, preventing the growth of almost all perennial vegetation. These barren clay flats are nearly always from a narrow geological stratum, the Atwell Gulch or Shire Member of the Wasatch Formation. Elevations range from 5,040 to 6,200 feet. All the known populations are within about 10 miles of De Beque, Colorado, in a narrow range of elevations, so an important consideration is the combination of climate and hard clay-pan soils that makes only annual growth possible. It is very likely that a strong affinity exists for some chemical characteristics the associated soils (USDA Forest Service/WRNF 2002b).

Table BE-51. Travelway densities by alternative for lands within the shrubland communities on the White River National Forest

Type of Use	Density (miles/square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.99	0.99	0.85
Mechanized	0.27	0.27	0.18
Mot/mech	1.26	1.26	1.03
Foot/horse	0.33	0.33	0.41
Total	1.59	1.59	1.44
Scheduled for Decommission (reduction in density)	0.58	0.33	0.44

Approximately 434 square miles of potential habitat were analyzed for these species.

For shrubland communities that would support associated populations, in alternative G there is a decrease in motorized, mechanized, and motorized/mechanized mix. In Alternative G there is an increase in foot/horse traffic from 0.33 miles/square mile to 0.41 miles/square mile. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Determination

Because habitat occupied by *Phacelia scopulina* var. *submutica* is assigned by management area prescription as a research natural area, with vehicles restricted to designated routes in summer and the area closed to motorized travel in winter, any alternative **MAY ADVERSELY IMPACT INDIVIDUALS OF *PHACELIA SCOPULINA* VAR. *SUBMUTICA* OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Porter Feathergrass

Porter feathergrass (*Ptilagrostis porteri*) is discussed in the BE for the forest plan. That document (USDA Forest Service/WRNF 2002a) provides life history and other general information. Almost all the sites for *Ptilagrostis porteri* are in northern Park County, Colorado, although there is one small site in adjacent Summit County, Colorado, and a newly discovered site in northwestern El Paso County, Colorado (Johnston 2001c). There is an old collection (1873) from Twin Lakes, Lake County; however, the populations there have not been rediscovered in recent years. Population sizes vary from 15 to more than 1,500 individuals. The one population on the White River National Forest is small; only 15 individuals at last count (Johnston 2001c). In some years the plants were not found after some searching, probably because of responses to environmental conditions. The White River National Forest site is small to very small, although the population is apparently stable (Johnston 2001c).

The plants occur in short-to-mediumheight willow carrs, where tufted hairgrass is codominant (Johnston 2001c). However, the species seems to be more abundant on peat

hummocks in calcareous fens in northern South Park. The habitat for the one occurrence of *Ptilagrostis porteri* on the White River National Forest is a very small population that occurs in a small willow stand in the alpine zone (Johnston 2001c). As far as known, the large carr-planeleaf willow-bog-birch sites that represent the typical habitat for *Ptilagrostis porteri* do not occur on the White River National Forest. The White River National Forest site is relatively gentle and it would be easy to access the *Ptilagrostis* site in summer or winter. Given the steadily increasing vehicle use of the roads in this area, vehicles will begin using the *Ptilagrostis* site, which would have a detrimental effect on the population. This *Ptilagrostis* site has fairly deep soil (for an alpine site), so it is sensitive to vehicle use.

Table BE-52. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

Approximately 474 square miles of potential habitat were analyzed for these areas.

Within alpine habitats, alternative G decreases motorized, mechanized, motorized/mechanized and foot/horse use. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

Determination

Because the population would be protected by designation of a special interest area under the forest plan, all alternatives would restrict motorized vehicles to designated routes in the summer and the area is closed to motorized travel in the winter. The determination under all the alternatives is **MAY ADVERSELY IMPACT INDIVIDUALS OF *PTILAGROSTIS PORTERI* OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Ice Cold Buttercup

Ice cold buttercup (*Ranunculus karelinii)* is discussed in the BE for the forest plan under the taxonomic designation *Ranunculus gelidus* ssp. *grayi*; further information can be found in that document (USDA Forest Service/WRNF 2002a). *Ranunculus karelinii* is still rare in R2, with small populations of about 7 to 10 occurrences in Wyoming, 15 to 20 in Colorado, and about 10 in Montana. The plants are small and difficult to spot unless the yellow flowers are visible; few places have been deliberately searched for this species. Most of the populations seem small, ranging from 3 to 50 in the six populations counted in Colorado, and are in the

high alpine zone (12,700 to 14,100 feet). The populations occur on ridge tops and peaks, in rocks and scree, where there have been low-lying snow banks or in the rivulets below them (Johnston 2001f). Many known sites are in wilderness areas and the habitats are usually away from trails. This species is disjunct from core populations in Alaska and Canada. While its habitat is high alpine, it is at risk from recreationists who climb the high peaks and trail realignments (Johnston 2001f). This species occurs in three sites on the White River National Forest, all in Summit County and all in the backcountry recreation, non-motorized management area prescription (Johnston 2001f).

Table BE-53. Travelway densities by alternative for lands within the alpine habitats on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.11	0.11	0.10
Mechanized	0.07	0.07	0.06
Motorized/mechanized	0.18	0.18	0.16
Foot/horse	0.26	0.26	0.26
Total	0.44	0.44	0.42
Scheduled for decommission (reduction in density)	0.00	0.00	0.03

Approximately 474 square miles of potential habitat were analyzed for these areas.

Within alpine habitats, alternative G decreases motorized, mechanized, motorized/mechanized and foot/horse use. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

Determination

Ice cold buttercup is within the backcountry recreation, non-motorized management areas prescription, which provides a measure of protection. On the assumption that only lawful, authorized activities will occur on this species' habitat, any of the alternatives **MAY ADVERSELY IMPACT INDIVIDUALS OF *RANUNCULUS KARELINII* OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Sun-loving Meadowrue

The Sun-loving meadowrue (*Thalictrum heliophilum*) was not covered by the BE for the forest plan. Sun-loving meadowrue is an endemic of western Colorado, known only from Rio Blanco, Garfield, and Mesa counties. This species is one of several that are endemic to a very restricted geologic formation in the dry basins and mesas of western Colorado. It is adapted to steep talus slopes on open, sunny sites on soils that are undeveloped, with sparse vegetation. Sun-loving meadowrue grows on sites with continually shifting substrates and is considered a pioneer species with the ability to colonize unstable, environmentally severe sites, under extremes of heat in summer, cold in winter, long dry spells, and high incident light. There are known occurrences from the Piceance Basin, the

Parachute and Roan creek drainages (off the White River National Forest), and the watershed divide between the Grand Mesa Uncompahgre National Forest and White River National Forest (Johnston 2000a). *Thalictrum heliophilum* occurrence on the White River National Forest is within the normal range of habitats for the species but is still separated from all other populations by the Colorado River. It is the only know population on the south side of the Colorado River (Johnston 2000a). The primary threat to this species is further oil shale exploration and extraction. Mining could cause a direct threat to habitat for this species by direct destruction and by increasing soil and substrate erosion and shifting (Johnston 2000a).

The White River National Forest site and most of the other potential habitats for this species on the White River National Forest occur on a large area without any roads. Access is difficult because of physically challenging terrain and the requirement to get permissions to cross private land (Johnston 2000a). Current forest plan direction is for elk habitat, which offers non-motorized recreation opportunities and limits motorized activities. There are designated routes that go to the pass at Kim, about half-mile east of the eastern edge of the known *Thalictrum heliophilum* population. There are no designated routes in or near the known population (Johnston, 2000a).

Table BE-54. Travelway densities by alternative for lands within the sagebrush communities on the White River National Forest

Sagebrush	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	1.64	1.64	1.28
Mechanized	0.27	0.27	0.18
Mot/mech	1.91	1.91	1.47
Foot/horse	0.29	0.29	0.38
Total	2.20	2.20	1.85
Scheduled for Decommission (reduction in density)	0.00	0.49	0.75

Approximately 73 square miles of potential habitat were analyzed for these species.

Within sagebrush habitat, in alternative G there is a decrease in motorized, mechanized, and motorized/mechanized mix. In alternative G there is an increase in foot/horse traffic from 0.33 miles/square mile to 0.41 miles/square mile. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Table BE-55. Travelway densities by alternative for lands within pinyon-juniper stands on the White River National Forest

P/J	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	0.33	0.33	0.27
Mechanized	0.08	0.08	0.05
Mot/mech	0.41	0.41	0.31
Foot/horse	0.03	0.03	0.09
Total	0.44	0.44	0.40
Scheduled for Decommission (reduction in density)	0.00	0.04	0.07

Approximately 33 square miles of potential habitat were analyzed for this species.

In alternative G motorized, mechanized and motorized mechanized mix will decrease in use. Foot/horse traffic will increase in alternative G from 0.03 miles/square mile to 0.09 miles/square mile. Planned decommissioning of travelways reduces open travelway density in all of the alternatives when compared to the current, existing situation.

Determination

On the assumption that only lawful, authorized activities will occur on this species' habitat and because the species is endemic to a restricted area, any of the alternatives **MAY ADVERSELY IMPACT INDIVIDUALS OF THALICTRUM HELIOPHILUM OR ITS HABITAT BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This determination is predicated on the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and that any new projects will include site-specific analysis.

Sphagnum moss

Sphagnum moss *(Sphagnum angustifolium)* was not analyzed in the forest plan. *Sphagnum angustifolium* is typically associated with fens. This species is common across the continental boreal area, where it forms loose lawns in poor fens and bogs. It is typically found in fens with a pH of 4.5-5.5. This species is occasionally associated with *Tomenthypnum falcifolium*, *Sphagnum teres* or *Sphagnum warnstorfii* (www.peatnet.siu.edu). This species has not been surveyed for on the White River National Forest, but has the potential to occur on the forest.

Table BE-56. Comparison of travelway densities by alternative for lands within potential riparian habitat on the White River National Forest

Riparian	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	1.03	1.03	0.91
Mechanized	0.52	0.52	0.44
Mot/mech	1.55	1.55	1.35
Foot/horse	0.96	0.96	1.00
Total	2.51	2.51	2.35
Scheduled for Decommission (reduction in density)	0.00	0.39	0.52

Approximately 91 square miles of potential habitat were analyzed for this species.

Within riparian habitats, alternative G decreases motorized, mechanized, and motorized/mechanized mix use. Alterative G increases foot/horse traffic from 0.96 (miles/square mile) to 1.0. Planned decommissioning of travelways reduces open travelway density in alternative G when compared to the current, existing situation.

The forest plan provides direction that includes significant protection for riparian areas, which would be the primary habitat for this species on the White River National Forest. This direction includes watershed conservation practices (WCP) direction, riparian protection standards and guidelines for grazing, and standards for protection of sensitive species and their habitats (USDA Forest Service/WRNF 2002a).

Determination

Sphagnum moss is associated with fens. This species is common across the continental boreal area, where it forms loose lawns in poor fens and bogs. It is typically found in fens with a pH of 4.5-5.5. This species is occasionally associated with *Tomenthypnum falcifolium*, *Sphagnum teres* or *Sphagnum warnstorfii (*www.peatnet.siu.edu). Because the species is not currently known to occur on the WRNF, the determination under any of the alternatives is **MAY ADVERSELLY IMPACT INDIVIDUALS *Sphagnum angustifolium* , BUT WOULD NOT BE LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** This is following the assumptions inherent in the analysis—that there will be no new road or trail construction as a result of the proposed action, that the only ground-disturbing activities resulting from the proposed action will be routine maintenance activities and decommissioning of existing roads and trails, and any new projects will include site specific analysis.

APPENDIX C: MANAGEMENT INDICATOR SPECIES

Introduction

Management Indicator Species

Management indicator species (MIS) are species selected to serve strong roles as indicators of major management activities' effects or of ecosystem change. These species are selected to act as indicators of particular activities or habitats.

Forest Plan

The forest plan and amendment 3 to the forest plan (USDA Forest Service, WRNF 2002a, 2006) establishes the management indicator species and the protocols for measurement and study on the White River National Forest. The MIS are analyzed below to address potential impacts on wildlife from implementing the proposed action. A thorough viability assessment of species found on the White River National Forest was completed as a portion of the forest plan.

Forest plan objective and strategy for MIS:

Objective 1b - Provide ecological conditions to sustain viable populations of native and desired nonnative species and to achieve objectives for Management Indicator Species (MIS) and focal species

Strategy 1b.4 - Within 15 years, demonstrate positive trends in habitat availability, habitat quality, or other factors affecting sensitive species and Management Indicator Species.

Assumptions listed under the BA section (appendix A) apply to the MIS section as well.

Terrestrial Vertebrates MIS

Travel-management-related impacts on wildlife vary with the volume, timing, and type of travel; the species of wildlife in the area; the habitats involved; time of day or season of year; and a myriad of other factors. Several recent literature reviews of recreation impacts on wildlife have been completed. These include:

- Effects of Winter Recreation on Wildlife of the Greater Yellowstone Area: A Literature Review and Assessment (Olliff et al. 1999);
- Effects of recreation on Rocky Mountain Wildlife Habitat (Joslin and Youmans 1999);
- The Environmental Impacts of Recreation: a Bibliography (Anon. 1999);
- Forest Roads: A Synthesis of Scientific Information (USDA Forest Service 2000c);
- Wildlife and recreationists: Coexistence through management and research (Knight and Gutzwiller 1995);
- Effects of off-road recreation on deer and elk (Wisdom et al. 2004); and

- The Effects of Highways on Elk (*Cervis elaphus*) Habitat in the Western United States and Proposed Mitigation Approaches (Ruediger et al 2006)

These exhaustive reviews of past studies contain a wealth of information concerning the impacts on wildlife of vehicular and other types of recreation use. Many of the reports cite the effects of roads on habitat fragmentation; isolation of rare and unique habitats such as fens, bogs or alpine areas; direct effects such as collisions with animals and physical destruction of habitats; abandonment of habitats; and physiological stress reactions related to the impacts of travel management. The widespread, detrimental impacts of human disturbance on wildlife are well-documented throughout these reports. See the above documents for specific documentation of potential impacts.

The terrestrial vertebrate management indicator species and habitat types identified from the forest plan are:

- Cave bats
- Brewer's sparrow
- American pipit
- Virginia's warbler
- Elk

Cave Bats

Cave bats were chosen as a management indicator species for the forest plan revision to answer the question, "Are caves being managed so that bat species will continue to use the caves, and maintain populations in the areas adjacent to the caves?"

Management Issues

The primary management issue identified concerning bats is unregulated recreation use of natural caves used by bats for various life history requirements (USDA Forest Service/White River National Forest 2002a). Cave bat habitat on the White River National Forest is generally confined to the caves found within the karst topography areas of the forest and the abandoned mines left from early mineral exploration.

Some bats do roost in trees, rock crevices, and other natural features. It is not feasible to monitor bat use of these widely diverse areas, and these habitats are not the focus of the identified management issue.

Some historical data exists for bats on the White River National Forest. Past bat surveys were designed to produce presence/absence information and did not provide specific population data for any of the species surveyed. Information on approximate numbers of bats has been obtained during some of these surveys. The most complete of these surveys was a 2002 survey (Siemers 2002) of 99 caves in the state. This survey documented several caves on or near the White River National Forest occupied by bats. Ten caves either on the forest, or immediately adjacent to National Forest System lands, contained from 1 to at least 112 bats (the most found in any cave in the state during this survey) with up to five species. The cave with the highest number of bats is one of the better known caves in the area, access to which is managed by the local grotto group with a locked gate. Because of the sensitivity of bats to disturbances, the actual site locations and identification of species are not divulged in this report. Access to known caves on the forest varies from being near collector roads to requiring lengthy hikes over difficult

terrain with no roads or trails. The majority of the identified caves on the forest are found in steep, remote canyons, generally with difficult access.

A data spreadsheet has been developed documenting all of the known information concerning cave surveys and bats across the Forest. This information documents bat use of 9 caves on the Forest with one additional cave used by bats immediately off NFS lands. Some of these caves have had multiple formal and/or informal surveys conducted over the past 20 years, and various levels of trend information are available for several of these bat populations. Declining bat populations have been documented in at least one cave on the Forest. Other cave inventories indicate stable to possibly increasing numbers. Cave and bat location information is considered to be sensitive information due to the fragile nature of cave ecosystems. This information is kept on file at the Supervisor's Office in Glenwood Springs, but is not subject to public disclosure.

Most identified cave bat use on the forest is associated with the caves occurring on the White River Plateau and the area south and east of Glenwood Springs. Not all caves have been mapped across the forest, so karst topography was used to identify potential bat habitat. Karst topography in these areas provides the necessary features for the development of caves necessary for many species of roosting bats. Only a small fraction of the karst topography actually supports caves that would be suitable as roosting habitat for bats; the vast majority of the lands included in this analysis does not provide bat habitat.

Potential Impacts

This analysis is a very conservative evaluation of potential impacts on bats. Bat habitat will not be modified directly under any of the alternatives being analyzed in this document. The change in access provided by changes in the travel management across the forest retains some level of access to caves, either known or unknown at this time. No new roads or trails are being constructed under any of the alternatives; furthermore, because decommissioning and rehabilitation of roads and trails is proposed in alternatives F and G, overall access is expected to be reduced in those alternatives.

The analysis for bats (table MIS-1) included the following criteria:

- Miles of authorized travelway, by use type, within 2 miles of karst topography;
- Postulated increases in access, to provide the potential for increased recreation use of any caves that may be accessed by those travelways.

Table MIS-1. Travelway densities by alternative for lands within 2 miles of karst topography on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.69	0.69	0.58
Mechanized	0.22	0.22	0.17
Motorized/mechanized	0.91	0.91	0.75
Foot/horse	0.34	0.34	0.37
Total	1.26	1.26	1.12
Scheduled for decommission (reduction in density)	0.00	0.28	0.40

Approximately 953 square miles of potential habitat were analyzed for this species.

Karst topography on the White River National Forest covers a much broader area than the known caves supporting cave bat populations. Most roads and trails within this analysis area do not affect access to caves, because only a limited number of caves occur within

the large area under analysis. However, in some areas road and trail use may result in maintaining existing levels of recreation use of any caves that exist near these travelways. Because the locations of all caves on the forest are not known or mapped, it is not possible to quantify which specific roads and trails may affect these undiscovered cave habitats. For cave bats, alternative F is identical to alternative A. Alternative G reduces motorized and mechanized access while slightly increases foot/horse access. Both alternatives F and G would result in reduced road/trail densities across the forest because of decommissioning and rehabilitation of roads and trails.

The forest plan contains direction that results in additional protection for cave resources above those that existed prior to the revision (USDA Forest Service/White River National Forest 2002a). This direction includes cave standards 1 through 3:

- Cave standard 1–"Manage natural surface drainage and vegetation that may affect known caves or cave resources to protect cave micro-environments;"
- Cave standard 2–Management activities that may affect known caves will be designed to protect cave ecosystems;"
- Cave standard 3–"Identified significant caves will be withdrawn from mineral entry;" and wildlife standards 2 and 3:
- Wildlife standard 2–"Restrict actions within 500 feet of cave and mine bat roosts to those that will not negatively alter the vegetative and structural characteristics of roosts or impede the movements of bats;"
- Wildlife standard 3–"Restrict the release of the location of bat roosts to administrative purposes only in order to minimize disturbance to roosting bats."

Winter

Winter motorized uses would be reduced in all alternatives over the existing situation. Reduced winter use should reduce potential impacts to hibernating cave bats under all alternatives (table MIS-2).

Table MIS-2. Winter travelway miles and acres by alternative for lands within 2 miles of karst topography on the White River National Forest

Type of use	Alternative A	Alternative F	Alternative G
Winter open motorized (acres)	266,228	266,228	240,262
Winter restricted motorized (miles)	113,153	113,153	139,118
Winter Motorized Prohibited	216,742	216,742	216,742

955 square miles of potential habitat were analyzed for these bat species.

Alternative A and F would have the same number of acres of authorized motorized use areas during winter. Alternative G reduces the number of acres of open motorized and increases the number of motorized restricted acres. Fewer acres of open motorized areas are felt to equate to fewer potential of impacts on cave resources from recreation use.

Determination

None of the alternatives are expected to change either population or habitat trends for cave bats at the forest level for the following reasons:

- The lack of direct habitat alterations from the proposed action under all alternatives;
- The protection direction included in the forest plan for this group of species;

- The limited changes in overall miles of travelways for alternatives F and G (both would reduce existing mileage over the current situation on the forest) would have minimal effect on cave access;
- The overall reduction in road and trail densities for all alternatives over the existing situation due to future decommissioning efforts would reduce overall access;
- Any indirect effects of reduced access that results from the decommissioning of travelways would be too minor to allow meaningful analysis of either habitat or population trends;
- The potential of recreational disturbance impacts associated with any of the alternatives is expected to decrease slightly because of the decrease in overall road and trail density for all alternatives compared to existing densities.

Cave bat habitat would not be directly affected under any of the alternatives in the travel management plan; forest plan standards provide protections to cave resources; and there is a limited amount of potential for detrimental impacts on populations or habitats under any of the alternatives because all action alternatives would result in overall reduced densities of road and trails within the analysis area. Based on the limited potential for direct, indirect, or cumulative effects, there is not likely to be measurable effects on this group of species at the forest level from any of the proposed alternatives. Road and trail decommissioning under all action alternatives could lead to reduced access, resulting in minor long-term beneficial effects for cave bats on the forest. Any such increase is not expected to be measurable. All alternatives have been evaluated and none would create negative trends that would affect achievement of forest plan management indicator species objectives or create viability concerns for any of the species in this group. Bat populations will continue to be monitored across the forest using the protocol developed as a part of the forest plan. Some species of bats are on the regional forester's sensitive species list and are discussed in the BE. These species will continue to be monitored under Regional policies concerning sensitive species.

Brewer's Sparrow

Brewer's sparrow (*Spizella breweri*) were selected as forest management indicator species to answer the question, "Is sagebrush habitat being managed adequately to provide the quality and quantity of habitat for species dependent upon or strongly associated with sagebrush?" This species is a sensitive species on the White River National Forest and is discussed in more detail in the BE (appendix B).

Management Issues

The primary concerns for sagebrush-dependent species on the White River National Forest include the limited amount of sagebrush habitat on the forest, the vulnerability of the habitat to negative impacts from vegetation management activities, and the decreasing population trends for species associated with sagebrush throughout its range in western states (USDA Forest Service/White River National Forest 2002a). Brewer's sparrows have been documented in suitable sagebrush habitats across much of the forest. This species is used as an indicator of potential effects of management activities on sagebrush habitats across the forest.

Analysis of the RMBO and White River National Forest transect information indicates that this MIS showed no evidence of population declines from 1999-2007, either from the Ecological Section data or from the MCB data (Blakesley 2008). Populations appeared to

be stable (no trend evident) for all this species state-wide. There was evidence for an increasing log-linear trend in Brewer's Sparrow population size between 1999 and 2007 in the North-Central Highlands and Northern Parks and Ranges Ecological Sections (RMBO 2008). This analysis indicates that the trend for this species on the White River National Forest is stable to increasing at this time.

Potential Impacts

Sagebrush habitats would not be directly affected by any of the decisions proposed under this action; however, some sagebrush areas may benefit in the long term from road and trail decommissioning planned under the action alternatives, which propose decommissioning road across the forest including in sagebrush habitats. This decommissioning would result in those areas eventually reestablishing into native vegetation with the added benefit of less disturbance from human uses.

The primary impacts identified from any proposed alternatives include direct impacts associated with vehicle collisions causing death or injury to individuals and indirect impacts associated with harassment due to vehicles and human use of habitats that are used by Brewer's sparrow. Some potential for road kills exists across the forest; however, the relatively low speeds of vehicles using most forest roads lessens the potential for impacts, because most individuals would move out of harm's way before being hit. Indirect harassment of individuals may occur but the literature does not support harassment as being a major risk issue for this species. The literature does not indicate concerns for disturbance effects from motorized use of roads or trails in sagebrush areas for Brewer's sparrow. Therefore, disturbance effects from the use of roads or trails are expected to be minimal for Brewer's sparrow under all alternatives.

The White River National Forest has established transects for Brewer's sparrow in suitable sagebrush habitats on the forest. Polygons of habitat for transect placement were identified in 2004; transects were established on the Blanco, Eagle, Holy Cross, Rifle, and Dillon districts in the 2005 field season. Point counts have annually been conducted beginning in 2005 between 22 May and 11 June to establish baseline population estimates. Additionally, the Rocky Mountain Bird Observatory has been collecting state-wide transect count information for this species over the past 10 year period. Some of this transect information is directly applicable to the White River National Forest.

The analysis for Brewer sparrow is shown in table MIS-3. This analysis included all of the roads and trails located within areas mapped as sagebrush in the White River vegetation GIS coverage.

Table MIS-3. Travelway densities by alternative for lands within the sagebrush communities on the White River National Forest

	Density (miles/square mile)		
Type of Use	**Alternative A**	**Alternative F**	**Alternative G**
Motorized	1.64	1.64	1.28
Mechanized	0.27	0.27	0.18
Mot/mech	1.91	1.91	1.47
Foot/horse	0.29	0.29	0.38
Total	2.20	2.20	1.85
Scheduled for Decommission (reduction in density)	0.00	0.49	0.75

Approximately 73 square miles of potential habitat were analyzed for these species.

Within Brewer's sparrow habitat, alternatives A and F provide the same authorized uses. Alternative G reduces motorized use by 26 miles (21%) and mechanized by 6 miles (35%). Foot and horse access is increased by 6 miles on current, established routes. Planned decommissioning of travelways would reduce open travelway density in alternatives F and G when compared to the current, existing situation.

Sagebrush habitats would not be directly affected by any of the decisions proposed under this draft environmental impact statement; however, some sagebrush areas may benefit in the long term from road and trail decommissioning planned under some alternatives. This decommissioning would result in the eventual reestablishment of those areas into native vegetation with the added benefit of fewer disturbances from human uses. The literature does not indicate concerns about disturbance effects from motorized use of roads or trails in sagebrush areas for Brewer's sparrow. Disturbance effects from the use of roads or trails are expected to be minimal for this species under all alternatives.

The forest plan contains direction that results in additional protection for sagebrush-dependent wildlife resources above those that existed prior to the revision effort. This direction includes the rangeland ecosystem management standards and guidelines covering general livestock management (USDA Forest Service/White River National Forest 2002a, page 2-10 to 2-11); and sage-grouse and Brewer's sparrow standards and guidelines (USDA Forest Service/White River National Forest 2002a, page 2-25 to 2-26). These standards and guidelines all are specifically designed to maintain sagebrush habitats in a condition that will provide suitable habitat for these species.

Winter

Brewer's sparrows are migratory and will be gone from the forest during the period of time winter travel is occurring. Winter motorized travel may affect sagebrush areas through impacts associated with direct crushing or compacting of snow. These impacts are expected to be minor across the existing range of sagebrush on the Forest. These minor impacts may result in immeasurable impacts to Brewer's sparrow from winter travel management alternatives.

Determination

Under all alternatives, the proposed action is not expected to change either population or habitat trends for either of this species at the forest level for the following reasons:

- The lack of direct detrimental habitat alterations from the proposed action;
- The protection direction included in the forest plan for the habitat of this species;
- The low likelihood of increased recreational disturbance impacts associated with any of the alternatives;
- The limited changes in the overall miles of travelways for all action alternatives;
- The overall reduction in road and trail densities for all alternatives over the existing situation because of future decommissioning efforts; any direct habitat enhancement that results from the decommissioning of travelways would be too minor to allow meaningful analysis of either habitat or population trends.

Sagebrush habitat would not be directly adversely affected under any of the alternatives in the travel management plan; forest plan standards provide protections to sagebrush resources; and there is limited potential for direct impacts to individuals or population due to limited scope of the proposed action. Only limited indirect effects due to disturbances associated with human use of roads and trails are expected to result from the

implementation of any of the alternatives. No cumulative impacts have been identified that would affect the populations or habitat of these species on National Forest System lands. Based on the limited potential for direct, indirect, or cumulative effects, there are not likely to be measurable effects to this species at the forest level from any of the proposed alternatives. Road and trail decommissioning and rehabilitation under all action alternatives would lead to reduced access resulting in minor long-term beneficial effects for sagebrush-dependent species on the forest. Any such increase is not expected to be measurable. All alternatives have been evaluated and none would create negative trends that would affect achievement of forest plan management indicator species objectives or create viability concerns. Populations of Brewer's sparrow will continue to be monitored across the forest using the protocols developed as a part of the forest plan.

American pipit

American pipit (*Eremophilia alpestris*) was selected for monitoring to answer the question, "Is the alpine grassland habitat being managed to provide habitat for those species dependent or strongly associated with alpine grassland habitats?"

Management Issues and Potential Impacts

The primary habitats for American pipit include the alpine grassland areas as well as grasslands in the lower portions of the forest. The primary risk factors affecting alpine grassland communities on the White River National Forest have been identified as recreation and livestock management in alpine areas. These areas are very sensitive to disturbances that alter vegetation cover, because the soils are very unstable and have low fertility, and because the vegetation is slow-growing (USDA Forest Service/White River National Forest 2002a).

Analysis of the White River National Forest transect data and the RMBO data indicates that this MIS showed no evidence of population declines from 1999-2007, either from the Ecological Section data or from the MCB data. Populations appeared to be stable (no trend evident) for this species state-wide and in the Northern Parks and Ranges Ecological Section (Blakesley 2008). This analysis indicates that the trend for this species on the White River National Forest is stable at this time.

Approximately 126,000 acres (197 square miles) of alpine habitat on the White River National Forest supports grassland communities that may be suitable habitat for pipit. Most of these areas are located within designated wilderness areas across the forest. This information was developed from the riparian-non-forest GIS coverage at the forest level. The analysis for this species (table MIS-4) included the number of miles of roads or trails within grassland communities, by use types, by alternative, within the alpine land type association.

Table MIS-4. Travelway densities by alternative for lands within the alpine grassland communities on the White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.18	0.18	0.18
Mechanized	0.11	0.11	0.10
Motorized/mechanized	0.29	0.29	0.27
Foot/horse	0.41	0.41	0.46
Total	0.70	0.70	0.73
Scheduled for decommission (reduction in density)	0.00	0.19	0.16

Approximately 197 square miles of potential habitat were analyzed for this species.

For alpine grassland communities that may support pipit populations, none of the alternatives would increase motorized road and trail density over alternative A. Alternative G would add a total of approximately 10 miles of foot and horse travelways (0.06 miles per square mile) over alternative A. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in all action alternatives when compared to the current, existing situation.

The forest plan contains direction that results in additional protection for alpine communities above those that existed prior to the revision effort. This direction includes rangeland ecosystem management standards and guidelines covering general livestock management (USDA Forest Service/White River National Forest 2002a, pages 2-10, 2-11); and alpine standards and guidelines (USDA Forest Service/White River National Forest 2002a, page 2-8 as amended). These standards and guidelines are all specifically designed to maintain alpine ecosystems.

Winter

Pipits are migratory and will be absent from the forest when winter travel is occurring. No direct impacts on their populations are expected from winter travel in any of the alternatives. There is a possibility of some effects to alpine ecosystems from motorized winter travel and from the continued use of the winter sports resorts found on the Forest. These impacts are expected to be minor and not measurable at the scale of the Forest. There would be no measurable impacts to pipit or its habitats from any of the winter travel management alternatives.

Determination

The primary impacts identified from any of the proposed alternatives include direct impacts associated with vehicle collisions causing death or injury to individuals and indirect impacts associated with disturbance and harassment due to vehicles and human use of habitats used by this species. Some potential for road kills exists across the forest; however, the low density of motorized routes coupled with the relatively low speeds of vehicles using most forest roads in pipit habitat lessens the potential for impacts because most individuals would move out of harm's way before being hit. Indirect disturbance and harassment of individuals may occur; however, the literature does not support this being a major risk factor for this species. Therefore, disturbance effects from the use of roads or trails are expected to be minimal for pipit under all alternatives.

The proposed action is not expected to change either population or habitat trends for these species at the forest level for the following reasons:

- The lack of direct detrimental habitat alterations from the proposed action;
- The protection direction included in the forest plan for the alpine habitats used by this species;
- The reduced likelihood of recreational disturbance impacts associated with any of the alternatives because of reduced road and trail densities;
- The overall reduction in road/trail densities for all alternatives over the existing situation because of future decommissioning efforts; any direct habitat enhancement that results from the decommissioning of travelways will be long-term and too minor to allow meaningful analysis of either habitat or population trends at the forest level;
- None of the alternatives results in any changes to livestock management across the forest; this potential risk factor will not be changed or affected by the actions under this draft environmental impact statement.

Alpine grassland ecosystems would not be directly adversely affected under any of the alternatives in the travel management plan; forest plan standards provide protections to alpine ecosystems; and there is limited potential for impacts to alpine grassland dependent species due to the limited scope of the proposed action. No cumulative impacts have been identified that would affect these habitats on National Forest System lands. Based on the limited potential for direct, indirect, or cumulative effects, there are not likely to be measurable effects on alpine grassland communities at the forest level from any of the proposed alternatives. Road and trail decommissioning rehabilitation under all action alternatives should lead to reduced access resulting in minor long-term beneficial effects for alpine grassland-dependent species on the forest. Any such increase is not expected to be measurable. All alternatives have been evaluated and none would create negative trends that would affect achievement of forest plan management indicator species objectives or create viability concerns. This species will continue to be monitored across the forest using the protocol developed as a part of the forest plan.

Virginia's Warbler

Virginia's warbler (Vermivora virginiae) was selected as a forest management indicator species to answer the question, "Does forest management maintain populations of species dependent on dense shrub habitat dispersed throughout the shrub cover types?"

Management Issues and Potential Impacts

The major risk factors identified for this species include prescribed fire that decreases the density of shrub habitats. Virginia's warbler is a species closely associated with dense shrub stands. On the White River National Forest, these birds are found in many shrubland types from approximately 6,000 to 9,000 feet.

Analysis of the White River National Forest transect data and the RMBO transect data for this MIS showed no evidence of population declines from 1999-2007, either from the Ecological Section data or from the MCB data (Blakesley 2008). Populations appeared to be stable (no trend evident) for this species state-wide and there was evidence for an increasing linear trend in Virginia's Warbler population size between 1999 and 2007 in the Northern Parks and Ranges Ecological Section including the White River National Forest (Blakesley 2008). This analysis indicates that the trend for this species is stable to increasing on the White River National Forest at this time.

Approximately 278,000 acres (434 square miles) of shrubland habitats occur on the White River National Forest that may be suitable habitat for warbler. Most of these areas are located across the lower elevations of the forest. The analysis for this species included the number of miles of roads or trails within shrubland communities, by use types, by alternative (table MIS-5).

Table MIS-5. Travelway densities by alternative for lands within the shrubland communities on the White River National Forest

Shrublands	Density (miles/square mile)		
Type of Use	Alternative A	Alternative F	Alternative G
Motorized	0.99	0.99	0.85
Mechanized	0.27	0.27	0.18
Mot/mech	1.26	1.26	1.03
Foot/horse	0.33	0.33	0.41
Total	1.59	1.59	1.44
Scheduled for Decommission (reduction in density)	0.58	0.33	0.44

Approximately 434 square miles of potential habitat were analyzed for these species.

For shrubland communities that would support warbler populations, alternative A and F allow the same authorized uses. Alternative G decreases motorized and mechanized routes while increasing foot and horse access. Planned decommissioning and rehabilitation of travelways would reduce open travelway density in all the alternatives when compared to the current, existing situation.

Winter

Warblers are migratory and will be gone from the forest when winter travel is occurring. A large portion of the shrubland habitat on the White River National Forest occurs within management prescriptions (5.41 and 5.43) that afford some level of protection from winter uses that might affect this species. Additionally, these habitats often occur on steep terrain that also provides some protection from motorized impacts. No measurable impacts on Virginia's warbler habitats are expected from winter travel. There would be no direct impacts to warblers from any of the winter travel management alternatives.

Determination

The proposed action is not expected to change warbler population or habitat trends for this species at the forest level for the following reasons:

- The lack of direct detrimental habitat alterations from the proposed action;
- The low likelihood of increased recreational disturbance impacts associated with any of the alternatives;
- The limited changes in the overall miles of travelways for all alternatives;
- The overall reduction in road and trail densities for the action alternatives over the existing situation because of future decommissioning efforts; any direct habitat enhancement that results from the decommissioning of travelways would be too minor to allow meaningful analysis of either habitat or population trends.

There is no current literature that indicates that warblers are significantly disturbed by motorized, mechanized, or foot/horse use of existing roads or trails. Shrubland ecosystems would not be directly adversely affected under any of the alternatives in the travel management plan. There would be no disturbance-related impacts, and there is limited potential for impacts on shrubland-dependent species because of the limited scope of the proposed action. No cumulative impacts associated with this proposed action have been identified that would affect these habitats or this species on National Forest System lands. Based on the limited potential for direct, indirect, or cumulative effects there is not likely to be measurable detrimental effects on warbler habitats at the forest level from any of the proposed alternatives. All the alternatives have been evaluated and none would create negative trends that would affect achievement of forest plan management indicator species objectives or create viability concerns. There may be a slight, long-term beneficial effect on overall habitat for this species due to road and trail decommissioning. Any beneficial effect would be too minor to be measurable at the forest level. This species will continue to be monitored across the forest using the protocol developed as a part of the forest plan.

Elk

The American elk (*Cervus elaphus)* was selected as a White River National Forest management indicator species to answer the monitoring question "Does forest motorized and non-motorized travel and recreation management result in effective use of habitat by large wild ungulates?"

The major risk factors identified for this species include the reduction in forage and cover habitats and disturbance from human uses, especially in calving and wintering areas. There would be changes in motorized, mechanized, and non-motorized travel associated with the different alternatives in this analysis.

Distribution and Abundance

Elk occur throughout the mountainous regions of the western United States and Canada. Elk populations throughout its range were very low in the early 1900s.

Elk are habitat generalists and their populations respond to climate-induced factors (such as forage availability and quality). Hunter harvest also can have a strong influence on populations, especially when security habitat (dense vegetation providing visual cover) is poorly distributed or scarce.

Hunter harvest currently is used to maintain populations within objectives set by the Colorado Division of Wildlife (CDOW). Where elk populations remain high or exceed population objectives set by the division, the cause often is a failure in providing secure habitat on public lands where hunter harvest can be used to maintain populations within objectives. Hunter harvest on private lands typically is more limited, because either access fees or landowner preferences restrict the number of hunters and the gender of elk harvested.

Region-wide, most elk populations are at or above herd management objectives, which are established within an estimated carrying capacity and balanced with hunter demand and other resource objectives, although data in this objective-setting process are typically limited and many assumptions are made. Mortality in elk populations in Colorado is mainly due to predation on calves, hunting, and winter starvation (Fitzgerald et al. 1994).

Habitat Associations

Elk habitat occurs throughout the mountainous regions of western North America. The habitat on the White River National Forest includes all the major vegetation types and most of the minor types found in the Southern Rocky Mountains. The White River National Forest provides most of the summer range for the herds in the general area. Certain areas in the extreme lower elevations of the White River National Forest are used as winter or transitional range but the vast majority of the winter range occurs off the White River National Forest. Winter range is considered to be the most limiting seasonal range for most elk populations on the forest (CDOW 2002). Approximately 10 percent of the winter range is found on National Forest System lands for the populations of elk that spend the summer on the White River National Forest. The remaining 90 percent is located on either BLM lands or private lands surrounding the forest (CDOW 2002).

Forest Plan Goals, Objectives, Standards, and Guidelines for Elk Management

Objective 1b. Provide ecological conditions to sustain viable populations of native and desired nonnative species and to achieve objectives for management indicator species and focal species.

Strategy 1b.4. Within 15 years, demonstrate positive trends in habitat availability, habitat quality, or other factors affecting sensitive species and management indicator species.

Management indicator species objective for elk. Manage motorized and non-motorized travel and recreation management to maintain effective use of habitat by large wild ungulates.

Wildlife Standard 1. Seasonal restrictions will be applied to reduce disturbance in key wildlife habitats.

Wildlife Standard 7. Vegetation treatments and new roads and trails will not reduce the elk habitat effectiveness index below 0.40 by data analysis unit (DAU), or further reduce effective habitat in DAUs that are already at or below 0.40 on National Forest System lands.

Infrastructure Standard 2. Close and rehabilitate temporary roads when no longer needed for project purposes.

Infrastructure Guideline 1. Consider seasonal restrictions for travelways if: use causes unacceptable damage to soil and water resources due to weather or seasonal conditions; use causes unacceptable wildlife conflict or habitat degradation; use results in unsafe conditions due to weather conditions; the area accessed has a seasonal need for protection or non-use; or it is necessary to resolve conflicts between users.

Infrastructure Guideline 4. Consider road decommissioning: when there is no longer any need for the road; when environmental degradation is occurring; when the cost of continued maintenance exceeds available funding; when alternative routes may be available; and to protect natural or cultural resources.

Population Trends

The CDOW has specific elk management goals and objectives developed in cooperation with landowners, the public, and federal land management agencies. These plans help guide the state's direction in the management of elk on the various data analysis units (DAUs) (figure MIS-1); they also provide data for recommending specific hunting

regulations to meet state herd objectives. Periodically these plans are updated to cover land management changes, new social perspectives, and changes in elk populations.

Data analysis units are composed of game management units (GMUs), (table MIS-17). GMUs are used to implement harvest objectives defined in a specific DAU. Land status and management can be composed of private, federal, corporate, and state lands, with percentages of each varying by area. In some cases, land status may overlap DAU and GMU boundaries. The White River National Forest contains portions of the following elk DAUs: E6, E12, E13, E14, E15, and E16, located in the northwestern part of Colorado covering 10,873 square miles (figure MIS-1). Approximately 3,853 square miles (35 percent) of these DAUs are found within the proclaimed boundary of the White River National Forest. Table MIS-18 displays the land ownership status of the DAUs found on the White River National Forest. The total populations, cow/calf ratios, and harvest figures presented below include data covering the entire DAUs mentioned. However, for the purposes of the travel management plan, all analyses on the data for the DAUs are completed only for National Forest System lands. Data are inadequate concerning either habitat conditions or road and trail mileage or uses to include lands other than National Forest System lands in this analysis package. The factors that vary by alternative are only those that occur on National Forest System lands, that is, roads and trails under Forest Service management jurisdiction. Habitat condition descriptions and road and trail mileages used throughout this report include only National Forest System lands.

The CDOW uses several methods to determine population objectives for DAUs. Monitoring of populations may be done by one or more of the following methods: postseason aerial counts, radio telemetry, computer model simulations, density estimates, quadrate surveys, line transects, research projects, and phone or written hunter surveys (CDOW 2002). Table MIS-6 displays the population objectives and game management units within the DAUs on the White River National Forest. Table MIS-7 shows the land ownership status of DAUs on the forest.

Table MIS-6. Population objectives and population estimates for the data analysis units on the White River National Forest

DAU	Game management units	Population objective	2003 data post hunt
E6	211,11,12,13,131,231,23,24,25,26,33,34	43,000*	48,102
E12	35,36	5,000*	7,041
E13	28,37,371	3,000	4,200
E14	42,421,41,411,52,521	10,500**	11,543
E15	43,471	4,500*	4,903
E16	44,444,45,47	6,000*	5,841
Total		**72,000**	**81,630**

**Draft population objectives, in the Draft 2002 DAU Plans (CDOW Draft 2002).*

*** From 1995 final DAU plan (CDOW 1995).*

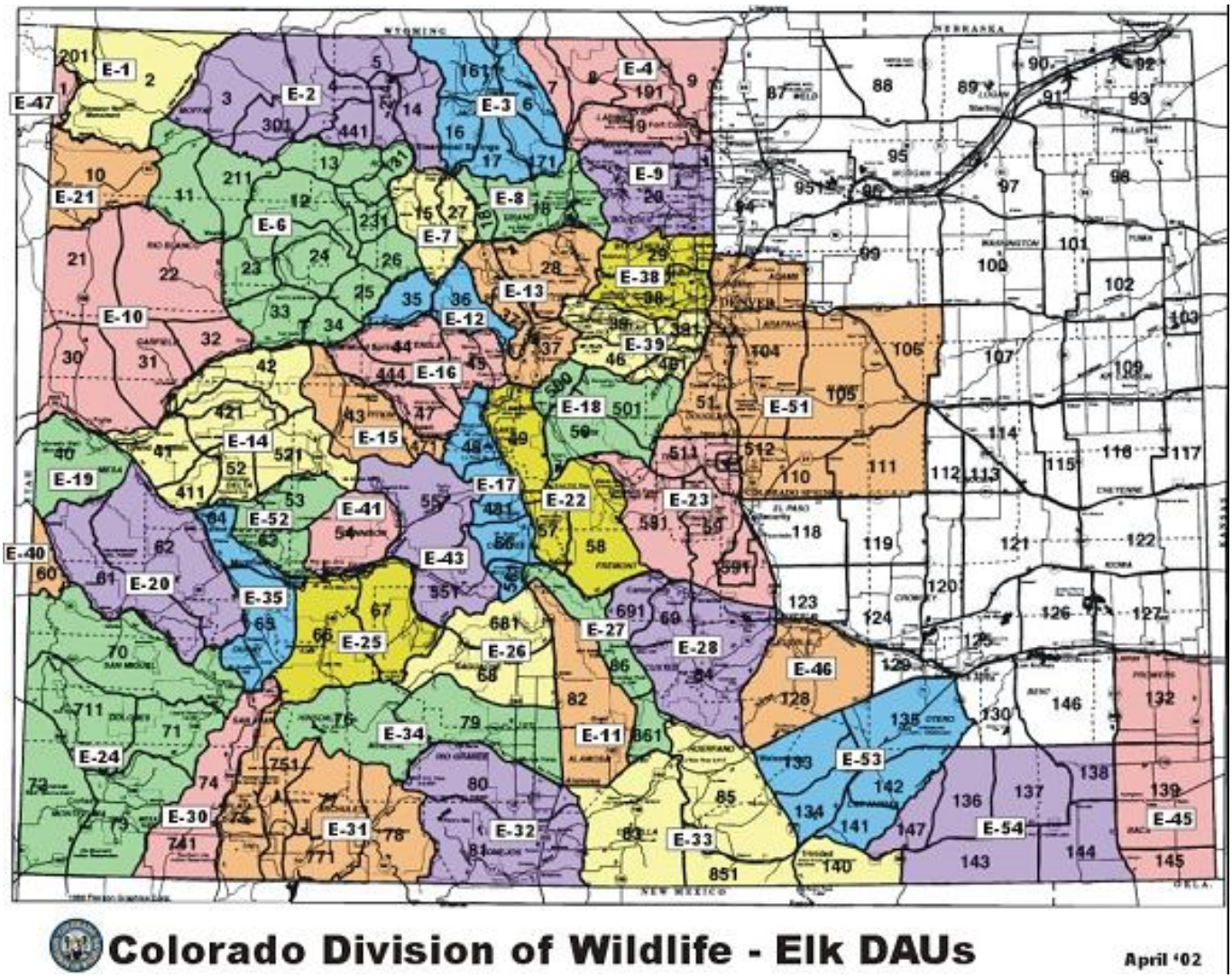

Figure MIS-1. Elk DAUs for the State of Colorado; portions of DAUs 6, 12, 13, 14, 15, and 16 overlay the White River National Forest.

Table MIS-7. Land ownership status of each DAU found on the White River National Forest in square miles and percentage of DAU on White River National Forest

DAU	White River National Forest	BLM	Private	State^	CDOW^^	Total
	square miles(%)	----------square miles----------				
E6	1,395.0 (33)	890.0	1,725	130.0	35.0	4176
E12	2,50.1 (40)	219.8	147.4	4.8	5.5	627.6
E13	479.1*(35)	70.4	402.0	10.8	4.1	1369.2
E14	197.3**(8)	464.0	930.6	27.5	0	2471.2
E15	561.0 (66)	65.0	223.0	1.0	0	851.0
E16	970.3 (70)	124.7	269.5	5.4	8.5	1378.4
Total	**3,852.8(35)**	**1833.9**	**3,697.5**	**179.5**	**53.1**	**10,873.4**

^ other than Division of Wildlife

^^ CDOW = Colorado Division of Wildlife

** An additional 392 square miles of this DAU are located on the Arapaho-Roosevelt National Forest.*

*** An additional 851.8 square miles of this DAU are located on the Grand Mesa and Gunnison National Forests.*

Today, two of the largest influences on management of elk are human population growth and land development (CDOW 2002). Both these factors influence the way the state manages these big game populations. The most influence from land development can be seen on winter range and transitional range, with some influence associated with summer range, particularly the borders of federally managed lands or development occurring on federally managed lands. The human population grows every year, which puts greater demands on habitat conditions and increases recreational activities, which in turn can influence big game population objectives.

Hunting harvest and overall elk populations are tracked by the CDOW and included in each DAU plan. Overall, elk populations and resultant hunter harvests have increased significantly across the White River National Forest over the past 50 years Elk populations within the DAUs on the White River National Forest for the past 10 years are shown in table MIS-8. Overall population and harvest levels are important considerations in the setting of hunting season framework for each portion of the state. Although methods for estimating elk numbers have changed over the past 50 years, the estimates by the CDOW represent the best population estimates for elk in the area of concern. Furthermore, despite potential problems associated with changing methods, the pattern of population increase suggested by the data is well established throughout the western United States, and empirical support for the basic pattern is strong. The CDOW uses a spreadsheet model to predict post-hunt populations (CDOW 2002).

Table MIS-9. Elk population figures for DAUs E6, 12, 13, 14, 15, and 16 from 1998 to 2007

	DAU						
	E6	E12	E13	E14	E15	E16	Total
1998	51724	6544	7933	17501	8205	10595	**102,502**
1999	54699	6530	7877	18399	8147	11221	**106,873**
2000	58579	6909	7326	17464	7928	10202	**108,407**
2001	58269	6786	8186	16866	7905	9970	**107,980**
2002	58011	6349	7429	17244	6923	9193	**105,149**
2003	62319	5687	6366	17239	5876	8895	**106,381**
2004	50206	5915	6161	17062	5960	9195	**94,498**
2005	47531	6106	5888	16706	5242	8893	**90,366**
2006	45017	4911	5822	17230	5632	8899	**87,512**
2007	43868	4762	5978	15257	5013	7696	**82,574**
10 yr ave	51724	6544	7933	17501	8205	10595	**102,502**

The following information is from the most recent forest-wide MIS analysis of elk populations, sex and age ratios, and harvest information.

Summaries

Total population

The elk herd on the White River Plateau (DAU E6) appears to be in good health at the current time. Total population, bull harvest, bull to cow ratios and calf to cow ratios are all indicative of a healthy reproducing herd. At this time, there are no identified major MIS concerns with this segment of the elk population on the White River National Forest.

The elk herds on the remainder of the forest (DAUs E12, 13, 14, 15, and 16) have all declined over the past few years towards their respective DAU population objectives. All these herds have been actively managed over the past decade to reduce populations to within the current population objectives for the current, respective DAU management plans. None of the populations are currently within the DAU objectives, but most are moving towards the objectives. Overall, the forest wide estimated elk population remained fairly stable from 1998 to 2003 when it began to decline. Between 2003 and 2007 it has declined approximately 22%. The 2007 post-hunt estimate of all DAUs on the White River National Forest are below the 10-year averages. This reduction has been planned and is moving toward meeting the DAU goals set by the DOW. Due to these active management programs aimed at reducing populations, the reductions in these herds is not, in itself, an MIS concern. **At this time, there is no MIS concern about this decline.**

Calf:cow ratios

All DAUS except DAU E6 are currently showing possible signs of reproductive stress.

Most of the herds have shown sizeable reductions in overall populations, but they have also had downward trends in the calf to cow ratios over the past several years. In a normal, healthy population, a reduction in overall population should result in an increase in the calf to cow ratio as a positive reproductive response to the reduced population. A downward trend in the calf:cow ratio is normally an indication of some type of stress within the herd that is resulting in a downward trend in calf recruitment and/or survival. All of these herds currently have calf to cow ratios below 50:100, some lower than 40:100. Any figure below 50:100 is a concern as an indicator of possible reproductive

stress. These depressed calf:cow ratios are a concern to both the DOW and an MIS concern to the White River National Forest. Several potential factors may be contributing to this downward trend. They include:

1. Some of this decline may be a stress response of the population to being over the DAU population objective for the herd. The population may currently exceed the long-term carrying capacity of the habitat.
2. Long term severe drought throughout the Western United States, including Colorado. This drought has had effects on the production and nutritional values of the forage on all seasonal ranges for all wildlife species on the White River National Forest.
3. Continued development of private lands into home sites, businesses, and other developments. Much of this development has occurred within elk winter range and severe winter range. In most DAUs the majority of the winter range is found on private lands in the valley bottoms. Summer range is not generally felt to be a limiting factor for these herds.
4. Increased recreation use of public lands. Over the past 10 years there has not been a significant increase in motorized system roads or trails anywhere on the White River National Forest. Some new "user-created" roads and trails have occurred and use on these is not well-regulated at this time. The Forest is the most-visited National Forest in the United States with over 9.6 million visitors annually. If you subtract the 7.1 million skiers visiting resorts, the forest is ranked number 8 nationally with over 2.5 million visitors. This use continues to increase annually with increases in backcountry use potentially stressing elk. Not all impacts to elk occur from motorized uses. The increases in non-motorized human uses on the forest are also likely stressing elk on many of their seasonal ranges experiencing this increase in backcountry use by humans.
5. Gas development in the northern portion of DAU E14- The large scale of the gas field development in this part of the state has affected large areas of winter range, primarily at this time on BLM and private lands. These areas historically had low disturbances during the winter, but gas field development and maintenance activities now occur year-round.
6. Mountain pine beetle outbreak on the eastern half of the Forest. The impacts of this extensive mountain pine beetle epidemic are unknown at this time, but effects to elk habitat are possible.

The bull:cow ratios and the overall bull elk harvest have been fairly stable or increasing in these DAUS over the past 10 years. Neither of these parameters is of MIS concern at this time. Even in light of recent high cow harvest, the overall herd productivity is sufficiently recruiting new bulls into the population at a rate great enough to maintain long-term bull harvest in most DAUs.

Seasonal Evaluations for Elk

Summer

Topography, elevation, weather, livestock grazing, travel management, soil types, and plant communities are the main factors influencing habitat condition and capability. Elk are migratory, moving between winter and summer range throughout the year. Winter range is the most critical for this species on the White River National Forest, mainly

influenced by weather, forage, and body condition. Summer range can be critical if there is a very dry summer thereby decreasing forage amount and condition. Actions proposed under the travel management plan are not expected to result in direct changes to elk habitat on the forest because no new roads or trails would be constructed under any of the alternatives.

Winter

The analysis for winter travel management impacts on elk focused on the changes in use associated with the two major management areas identified in the forest plan that are managed as elk winter range (5.41, deer and elk winter range, and a subset of 5.43, elk habitat identified as having winter range values) (table MIS-9). Motorized and non-motorized recreation use of the portions of the forest supporting deep snow should have limited impacts on wintering elk since elk will not be in those areas during the heavy snow periods.

Table MIS-9. Winter travelway acres by alternative for lands within management area 5.41 and those portions of Management Area 5.43 identified as elk winter range on the White River National Forest

Type of use	Alternative A	Alternative F	Alternative G
Winter open motorized (acres)	266,228	266,228	240,262
Winter restricted motorized (miles)	113,153	113,153	139,118
Winter Motorized Prohibited	216,742	216,742	216,742

953 square miles of potential habitat were analyzed.

Alternative F and A allow identical authorized uses. Alternative G increases winter restricted uses and decreases winter open use areas.

Effects on Habitat from the Travel Management Plan for Elk

Direct and Indirect Effects on Elk Habitat

All alternatives. There would be no new road or trail construction under any alternatives proposed in this document (table MIS-10). The footprints of all roads and trails already exist on the ground. The type of use may change for various roads and trails by alternative, but ground-disturbing impacts from all alternatives would be limited to minor maintenance, the result of the actual use of the travelway, or the decommissioning of roads or trails. No direct modification of elk habitat would result from road or trail construction from any alternative. Elk use of potential habitat would result from the suitability of the habitat coupled with human use of the roads and trails across the forest. Some changes to elk use of suitable habitats would occur as human uses change from one category of use to another in various alternatives. Road and trail decommissioning under all alternatives should lead to reduced access resulting in minor long-term beneficial effects for disturbance impacted species on the forest. Any such increase is not expected to be measurable.

Table MIS-10. Travelway densities by alternative for the entire White River National Forest

Type of use	Density (miles per square mile)		
	Alternative A	Alternative F	Alternative G
Motorized	0.56	0.56	0.50
Mechanized	0.20	0.20	0.16
Motorized/mechanized	0.76	0.76	0.66
Foot/horse	0.36	0.36	0.39
Total	1.13	1.13	1.05
Scheduled for decommission (reduction in density)	0.00	0.25	0.32

Approximately 3574 square miles of potential habitat were analyzed for this species.

An analysis was completed to determine the number of blocks and acres of security blocks available for elk across the White River National Forest. Security blocks were defined as blocks of contiguous forested habitat greater than 250 acres and more than ½ mile from any road or trail open to motorized travel.

Table MIS-11. Summary of summer travel management by miles on the White River National Forest

Legend	Alternative A	Alternative F	Alternative G
Licensed Motorized Only	15	15	585
Licensed and Unlicensed Allowed	1724	1724	850
Motorized vehicles < 50” in width	109	109	143
Motorized two-wheeled vehicles	43	43	67
Mechanized (bicycles)	740	737	596
Foot and Horse (pack animal)	1339	1344	1440
Managed under special use permit	126	125	212
Closed to the public but remain on the system	60	59	32
Closed to the public but not decommissioned or rehabilitated	1252	0	0
Closed to the public and to be /or all ready decommissioned/rehabilitated	0	1252	1483
Total	5408	5408	5408

Table MIS-12. Security blocks on the White River National Forest

	Alternative A	Alternative F	Alternative G
Number of security blocks	105	105	98
Acres of security blocks	1,427,259	1,427,259	1,498,622
% of forest in security blocks	62%	62%	66%

Alternative A. Existing system roads and trails would continue to be used with the exception that within management areas that have road or trail density restrictions, some roads and trails have been identified for closure to assure compliance with forest plan direction. No unauthorized roads or trails would be added under this alternative, but these routes would not be scheduled for decommissioning in this alternative (except for routes already covered for decommissioning under existing NEPA). Table MIS-11 displays the number of roads and trails open to various uses under this alternative. Table MIS-12

displays the number of security blocks across the forest under each alternative. There would be a total of 204 blocks of security habitat that total over 1.4 million acres (62 percent of the forest) under Alternative A.

Alternative F. Alternative F is the minimal action alternative which makes Alternative A compliant with the Forest Plan direction and all applicable laws and regulations. Under this alternative all user-created routes are rehabilitated. No routes are adopted. No system routes are decommissioned. Tables MIS-11 and MIS-12 display the number of miles of roads and trails and the number of blocks of security habitat that would be open under this alternative. Although there are fewer numbers of blocks, the total acreage is the same as under alterative A indicating that at least some of the blocks are larger.

Alternative G. Alternative G is the preferred alternative and was designed by looking at the DEIS, public input, and implementation of the travel rule. This alternative also looks at which routes should be part of the system and which should be decommissioned or rehabilitated. This alternative has the greatest amount of security blocks.

Habitat effectiveness for elk would be increased slightly in DAU E12 and DAU E16 under this action alternative. Tables MIS-11 and MIS-12 display the expected number of road and trail miles and the number of security blocks that would result from the implementation of this alternative. No new roads or trails would be constructed under this alternative; however, some existing unauthorized routes would be added to the system. Many of these unauthorized travelways would be open to motorized uses but would be managed as local roads. This alternative results in the fewest number of system miles open to motorized and mechanized uses across the forest. Foot and horse routes are increased slightly across the Forest, but this is not expected to result in significant impacts to elk. Foot and horse use is already allowed across the Forest and this action would merely standardize routes already being used. Although there are fewer total blocks of security habitat, there are aver 70,000 more acres included in the blocks that are on the forest indicating larger blocks of secure areas.

Cumulative Effects for Elk

Oil and gas development, ski area expansions, vegetation management (including timber sales and prescribed fire), and grazing are all expected to continue on the White River National Forest. It is not possible to quantify the quantity, duration, or locations of these individual activities; however, they all have the potential to affect the way elk use the habitats on the forest. Private lands adjacent to the forest are expected to continue to be developed into homesites and other developments, which will affect elk most significantly in relation to the availability of winter range.

Suitable Habitat and Habitat Capability for Elk

Most of the White River National Forest is considered to be suitable habitat for elk for one or more seasons of use. Roads and other human developments reduce the habitat capability of the areas adjacent to these developments. There would be no direct habitat negative developments or changes to elk habitat associated with any of the alternatives associated with the travel management plan. Some long-term restoration of habitat would occur as roads are decommissioned and return to native vegetation. Changes to the habitat capability are a result of various levels of open motorized travelways in each alternative.

Effects on Elk Population Numbers as a Result of the Travel Management Plan

No impacts on the overall population are expected to occur because of changes in habitat under any of the alternatives. Elk response to any increase in motorized travel on the roads and trails open to use may increase the early fall migration of elk from public lands onto adjacent private lands without an overall effect to the population. As elk on private land are often not as available for harvest during the hunting season, higher levels of motorized use on the forest have the potential to result in an overall increase in the elk populations plus a corresponding decrease in the harvest. Road closure improves the security habitat for elk and has the potential to increase population numbers. This increase could be offset by increased hunter success resulting from the provision of secure elk habitat on National Forest System land, leading to more harvest on populations on public lands.

Forest Plan Management Indicator Species Objective for Elk

Manage motorized and non-motorized travel and recreation management to maintain effective use of habitat by large wild ungulates (USDA Forest Service/White River National Forest 2002a).

All action alternatives of the travel management plan meet this objective. Analysis at the DAU and the forest-wide levels indicate that habitat effectiveness would be maintained or improved under all alternatives. For the summer season, alternative A and F would maintain habitat, while alternative G would slightly increase effectiveness. This alternative is not expected to result in population increases that can be effectively measured or tied directly to the impacts of the proposed action, at either the DAU or forest level. None of the alternatives will affect the viability of elk on the White River National Forest.

Monitoring

Monitoring for elk as a management indicator species at the forest level is detailed in the 2005 White River National Forest MIS Elk Monitoring Protocol (USDA Forest Service/White River National Forest 2005) and the 5 year results (2003-2007) are detailed above. This monitoring protocol will continue to be implemented on the White River National Forest.

Cumulative Impacts for all MIS Terrestrial Vertebrate Species

The following assessment is applies to all terrestrial vertebrate management indicator species discussed in this report. The cumulative impacts assessment for this project includes those actions expected to occur on National Forest System lands of the White River National Forest over the next 5 to 10 years. General recreation use is expected to increase across the forest. Projections on future uses were documented in the forest plan environmental impact statement (USDA Forest Service/White River National Forest 2002b). Much of this recreation use will be centered around the access provided by existing roads and trails on the forest. Management of domestic livestock is expected to continue across the forest at levels similar to those found today. Oil and gas exploration is forecasted to increase in those portions of the forest that are authorized and available for those activities. Private lands within and adjacent to the forest will likely continue to see residential and associated business development. This development is expected to result in a slight increase in the overall density of roads and trails to access private lands parcels surrounded by National Forest System lands. Ski area expansions and vegetation

management (including timber sales and prescribed fire) are all expected to continue on the White River National Forest. It is not possible to quantify the quantity, duration, or locations of these individual activities; however, they all have the potential to affect the way various wildlife species use the habitats on the forest.

This environmental impact statement covers all National Forest System lands within the proclaimed boundary of the White River National Forest. As such, it does not cover any changes in the travel management options or other activities on private lands within the proclaimed national forest boundary for either state or private lands. At the scale of this document it is impossible to identify site-specific actions on either private or state lands that may affect listed species.

The majority of the state lands included with the proclaimed national forest boundary or immediately adjacent to the forest will continue to be managed very similarly to the current situation. Use is limited in scope and duration on state lands because most of these lands are either state parks that are managed to provide recreational opportunities for a wide range of users (Rifle Gap, Harvey Gap, and Sylvan Lake State Recreation Areas) or state wildlife management areas that are managed specifically for the benefit of wildlife and recreation (Christine, Toner Creek, Garfield Creek, Jenson, Coke Oven, and Radium State Wildlife Areas). No new major developments are expected to occur on these areas.

Private lands within the proclaimed boundary are expected to continue to be developed as private home sites and housing developments under county planning regulations. Many of these developments will take place within or adjacent to suitable sensitive and general species habitats. Urbanization brings with it a change of the landscape, more people, domestic animals, all contributing to a change of natural settings and fragmentation of habitat.

Aquatic MIS

Macroinvertebrate Communities

Aquatic macroinvertebrates are those invertebrates that spend at least part of their life cycle in water. These include worms, mollusks, mites, and insects. Insects are by far the most common. Most insect species spend just the immature phase (larval or nymph phase) in water. Although sensitive species occur in most insect orders, three orders are comprised primarily of species that are more sensitive to disturbance. These are Ephemeroptera (mayflies), Plecoptera (stoneflies), and Tricoptera (caddisflies). In this document, “EPT taxa richness” refers to the number of taxa in these three sensitive orders. Additionally, a White River National Forest specific metric was developed identifying local taxa sensitive to sediment.

Distribution and Abundance

Macroinvertebrate communities occur in all water bodies on the White River National Forest, including ponds, lakes, reservoirs, wetlands, rivers, perennial streams, and intermittent streams. Even degraded systems usually contain aquatic macroinvertebrates, however these communities look very different from those in pristine systems. On the White River National Forest, macroinvertebrate communities were selected to address trend and condition of flowing waters only and, therefore, macroinvertebrate communities in still water habitats will not be discussed further in this document. Because of their wide distribution and their sensitivity to disturbance and pollutants, macroinvertebrates are widely used to monitor the health of streams and rivers.

Habitat Associations

Macroinvertebrate communities are influenced by the timing of flow and water quality in the streams in which they live. Geology, elevation, temperature, gradient, and substrate distribution are other factors that commonly influence macroinvertebrate communities. As habitats are degraded, either by chemical pollutants, increased sediment, or unfavorable changes in flow (especially severe reductions), the response of the macroinvertebrate community is typically a reduction in the number of species which occur there and especially the number of sensitive species.

Forest Plan goal, Objectives, Standards, and Guidelines for Macroinvertebrate Communities, Fish, and Stream Health

Goal 1 Ecosystem Health: Promote ecosystem health and conservation using a collaborative approach to sustain the nation's forests, grasslands, and watersheds.

Objective 1a: Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial uses.

Objective 1: Provide ecological conditions to sustain viable populations of native and desired nonnative species and to achieve objectives for Management Indicator Species (MIS) and focal species.

MIS Objective for Macroinvertebrate Communities: Conduct forest management to maintain or improve water quality (including chemical aspects as well as sediment) such that aquatic faunal communities are similar between managed and unmanaged streams.

Strategy 1b.4: Within 15 years, demonstrate positive trends in habitat availability, habitat quality, or other factors affecting sensitive species and Management Indicator Species.

Water and Riparian Resources Standards:

- In each stream capable of supporting a self-sustaining fishery, ensure that projects maintain sufficient habitat, including flow, for all life history stages of native and desired non-native aquatic species.
- In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition.
- Design and construct all stream crossings and other instream structures to provide for passage of flow and sediment, withstand expected flood flows, and allow free movement of resident aquatic life.
- Conduct actions so that stream pattern, geometry, and habitats are maintained or improved toward robust stream health.

Population Trends for Macroinvertebrates

Forest-wide Trend Sampling

Macroinvertebrates were selected as a management indicator species during the 2002 forest plan revision and amendment. A sampling design was developed to select stratified random samples from across various types of management and livestock grazing types across the forest. Level of management was based on the forest plan management area prescriptions. Management area prescriptions are divided into 4 groups – all 1's and 2's

were combined (called “MA-1” in the table below), 3’s and 4’s were combined (“MA-3”), 5’s were combined (“MA-5”), and 7’s and 8’s were combined (“MA-7”). Since livestock is largely independent of management area prescription and can have significant effects to aquatic resources, the type of livestock grazing was also considered and each of the four categories of management area prescriptions were divided into cattle grazing, sheep grazing, and no grazing to form 12 categories. Since very few areas fell into the management area prescription category with 7’s and 8’s, all grazing types were combined into one category, reducing the total number of categories to 10 (e.g., “MA-1 Cattle” or “MA-1 C” in the tables below). Both common trout and aquatic macroinvertebrate communities were sampled from each site.

Five watersheds were randomly selected from each of the 10 management categories, with one site from each of the 10 management categories sampled each year over 5 years starting in 2003 with the rotation starting again in 2008. As such, in general, sites have each been sampled once to establish a baseline, but no repeat sampling has occurred. There are a few exceptions where a site was dropped for a variety of reasons (i.e. there were no fish present at the site, the stream or river was too large or swift to be safely and effectively sampled with our equipment, or grazing had been discontinued at a site selected to monitor grazing). Most of the sites that were dropped for any of the reasons mentioned above have been replaced and baseline sampling has occurred, but there are a few exceptions. Table 1a displays the results of baseline survey for Aquatic MIS, including fish, which are discussed later in this document. In addition, some sites have had macroinvertebrates sampled more than once (Table 1b). This is the case where these sites were needed to serve as Reference Sites for other projects across the forest and therefore tend to be sites within designated wilderness areas. These sites were not randomly selected for repeat sampling (therefore they are not representative) and were usually chosen to provide “reference” site data for analysis for various projects across the forest. Although there is not sufficient data to determine trends, in general sites seemed to support a more diverse community in later sampling.

Table MIS-13. Aquatic MIS sampling partial baseline results collected between 2003 and 2007

Site	Mgmt area	Date	Grad.	Alk.	Elevation	Width	% Fines	res.pool Depth	#EPT	Sed. sens.	Trout	Other sp
Big Fish Creek	MA1-C	08/29/03	2.5	92	8800	8.0	12	na	23	9	81	sculpin
*Campbell Creek	MA1-C	08/30/05	8.5	na	8799	1.8	31.6	0.14	14	4	none	none
Capitol Creek	MA1-C	08/18/06	1.6	150	9075	6.6	8.2	0.35	18	5	54	none
Ripple Creek	MA1-C	08/12/04	2.4	104	8920	3.4	9	0.32	21	7	45	none
*Ute Creek	MA1-C	08/22/07	2.4	--	8973	--	--	--	16	6	none	none
Avalanche Creek	MA1-no	09/03/03	3	102	8748	10.1	11.8	0.2	18	8	31	sculpin
*Black Creek	MA1-no	08/09/07	--	--	9062	--	--	--	13	6	na	na
East Maroon Creek	MA1-no	08/16/06	0.9	80	9399	7.2	3.9	0.48	16	6	79	none
Snowmass Creek	MA1-no	09/08/04	2	85	8874	6.7	6.3	0.66	17	6	79	none
Upper Fryingpan	MA1-no	08/18/05	2	44	10058				19	8	76	none
East Fork Crystal River	MA1-S	08/26/04	2.9	154	10511	4.4	6.1	0.19	18	6	1	none
Meadow Creek	MA1-S	09/26/05	7.6	76	8533	4	10.7	0.24	24	10	40	sculpin
North Fork Piney River	MA1-S	09/12/06	5	160	8030	3.6	10.6	0.26	24	11	45	sculpin
Piney River	MA1-S	09/11/03	4	32	9759	6.2	4	0.57	21	7	24	none
South Fork White River	MA1-S	8/14,15/07	0.9	76	9117	10.7	3.2	na	18	5	75	none
*Beaver Creek	MA3-C	08/04/04	2.5	130	9606	1.9	68.3	0.2	7	1	9	none
*Cache Creek	MA3-C	08/09/06	7	380	9869	2.5	10.8	0.34	14	4	none	none
Cottonwood Creek	MA3-C	09/02/03	4.7	200	7950	1.1	37	0.12	17	6	3	none
East Brush Creek	MA3-C	08/31/05	3.6	90	9423	4.1	6.4	0.27	20	8	52	none
Gypsum Creek	MA3-C	8/15,16/07	5.7	120	8602	3.7	25.5	0.22	16	8	31	none
Snell Creek	MA3-C	08/21/07	6.2	144	8386	4.3	3.4	0.31	22	8	14	sculpin
Chapman Gulch	MA3-no	08/27/07	0.8	60	8596	4.5	13.4	0.45	25	8	60	sculpin
Crystal Creek	MA3-no	09/08/03	8.4	na	10513	2.3	21.7	0.28	21	8	5	none
Express Creek	MA3-no	07/15/04	na	53	10773	1.5	19	0.45	9	1	4	none
McCullough Gulch	MA3-no	08/07/07	2.9	32	11329	4.2	8.7	0.42	13	3	none	none
South Fork Fryingpan	MA3-no	08/17/05	3	68	9488	8.0			11	5	128	none
Buck Creek	MA3-S	09/09/03	3	174	9960	2.5	4	0.24	16	6	77	none
Deep Creek (Eagle RD)	MA3-S	08/29/06	3	128	10597	3.6	4.8	0.25	20	6	136	sucker
East Fork Fawn Creek	MA3-S	08/20/07	7.4	320	7842	2.7	13.3	0.31	19	8	104	none

Site	Mgmt area	Date	Grad.	Alk.	Elevation	Width	% Fines	res.pool Depth	#EPT	Sed. sens.	Trout	Other sp
Milk Creek	MA3-S	08/15/05	3	164	8048	3.5	15.9	0.17	11	3	5	none
Morapos Creek	MA3-S	08/10/04	2.7	236	8150	2.5	15.3	0.28	20	3	36	sculpin dace
Cattle Creek	MA5-C	08/10/06	3	200	8562	3.7	25.9	0.35	19	8	75	sculpin
Derby Creek	MA5-C	09/29/05	2	156	7875	6.7	9.8	0.4	19	5	31	none
East Elk Creek	MA5-C	08/02/05	3.4	120	6450	7.5	6.7	0.21	19	6	28	sculpin
East Miller Creek	MA5-C	08/26/03	1	140	7198	4.7	22.5	0.29	10	5	14	sculpin
*Fourmile Creek	MA5-C	09/01/04	1.7	250	9040	2.4	45.7	0.2	na	na	none	sculpin
Middle Thompson Creek	MA5-C	08/29/07	na	168	7410	na	7.8	na	21	8	40	sculpin
Bennett Gulch	MA5-no	09/04/03	4.97	43	9908	1.5	22.2	0.14	20	7	26	none
*Miller Creek	MA5-no	08/03/06	4	80	8580	1.6	6.9	0.22	9	4	none	none
Miners Creek	MA5-no	08/06/07	3.7	20	9462	3.4	17.4	0.22	20	8	54	none
North Barton Gulch	MA5-no	07/22/04	5.1	44	10000	1.1	30.7	0.21	16	8	2	none
South Fork Swan	MA5-no	08/17/05	6.1	60	10020	2.4	6.1	0.17	21	8	23	none
West Grouse Creek	MA5-no	08/01/07	7.5	44	9397	3.2	10.4	0.22	17	7	47	none
Deep Creek (Rifle RD)	MA5-S	08/18/04	3.3	168	8905	2.2	22.5	0.17	12	4	45	none
East Canyon Creek	MA5-S	9/4, 10/2/03	2.4	174	9976	2.5	12.8	0.29	15	5	14	none
Resolution Creek	MA5-S	08/15/06	3.6	180	9595	2.8	20.3	0.24	21	9	42	none
Three Forks Creek	MA5-S	08/02/07	2	232	7581	3.9	na	0.48	7	1	29	none
Turkey Creek	MA5-S	09/01/05	5.8	200	9196	4.6	8.7	0.19	22	9	26	none
Castle Creek	MA7	08/28/07	1.5	188	8828	7.4	2.4	0.24	20	7	34	sculpin
Keystone Gulch	MA7	08/08/06	4.8	68	9992	3.0	7.8	0.27	18	8	40	none
Two Elk Creek	MA7	08/05/04	7.6	170	9220	3.2	26	0.32	17	6	28	none
West Tenmile Creek	MA7	08/23/05	2.5	112	9997	5.9	3.2	0.16	15	6	71	sculpin

**these sites have or will be replaced and will not be continued. In some cases, physical data was not collected at these sites.*

Table column definitions:
***Mgmt area**: code for which management area this site represents MA is the level of activity, C = cattle grazing, "no" = no livestock grazing, and "S" = sheep grazing.*
***Date** = date sampled*
***grad**. = reach gradient*
***alk**. = total alkalinity in ppm*
***elevation** = elevation at bottom of the reach*
***width** = average wetted width of sampled reach*
***% fines** = % of particles less than 6mm from Wolman pebble count*
***res.pool depth** = average residual pool depth*
***#EPT** = the number of Ephemeroptera, Plecoptera, and Trichoptera taxa collected during macroinvertebrate sampling*
***sed.sens.** = A WRNF specific metric of sediment sensitive macroinvertebrate taxa collected*
***Trout** = population of trout captured in the sampled reach based on a multiple pass depletion estimate (excludes young-of-year)*
***Other sp.** = other species of fish also present*

Table MIS-14. Two key macroinvertebrate metrics from the eight sites that were sampled more than once

Site (management code)	Metric	2003	2004	2005	2006	2007
Avalanche Creek (MA1 – no grazing)	# EPT	18		21		
	sed.sens.	8		9		
Big Fish Creek (MA1 – cattle grazing)	# EPT	23			26	18
	sed.sens.	9			9	5
East Maroon Creek (MA1 – no grazing)	# EPT				16	17
	sed.sens.				6	7
McCullough Gulch (MA3 – no grazing)	# EPT	11				13
	sed.sens.	2				3
Piney River (MA1 – sheep grazing)	# EPT		21	17		
	sed.sens.		7	6		
Ripple Creek (MA1 – cattle grazing)	# EPT		21		26	21
	sed.sens.		7		10	9
Snowmass Creek (MA1 – no grazing)	# EPT		17			23
	sed.sens.		6			7
Two Elk Creek (MA7)	# EPT		17	23		
	sed.sens.		6	9		

There is insufficient data to determine forest-wide trends, information is available, however, to discuss status and trends associated with forest management and human interaction that could affect macroinvertebrates.

Aspects that negatively impact macroinvertebrate trends include:

- Increased dispersed recreation use and increased use and expansion of developed sites such as campgrounds and ski areas is increasing sediment delivery to streams and impacting riparian vegetation.
- The recent increase in natural gas development on parts of the forest, specifically the Rifle Ranger District is potentially increasing sediment delivery to streams due to the increased level of disturbance and activity. Activity is expected on the Sopris Ranger District.
- Continued development of water for urban and other uses, including transbasin diversions, reduces instream flows.
- Urban development in communities around the White River National Forest has a suite of effects including removal of riparian vegetation, introduction of chemical contaminants, creation of barriers, and increased sediment delivery.

Aspects that positively affect macroinvertebrate trends include:

- Adoption of the Watershed Conservation Practices, including:
  - Limiting disturbance in the water influence zone
  - Improving road-stream crossings with structures that minimize stream impacts and allow aquatic organism passage
- Reduced livestock grazing on National Forest System lands as allotments are vacated primarily due to the loss of base property to development.

- Increased focus on watershed improvement with a continuing effort to find and correct existing problems from ongoing activities.
- Road improvements to disconnect disturbed areas from streams to reduce sediment input.

Recent forest management is considered to create a positive trend in macroinvertebrate communities with better protections in place and proactive projects to improve damaged areas. Growth outside the forest boundary and other aspects over which the forest has little control like water development and natural gas development are likely to be contributing to a negative trend in localized areas. At this time, it is not possible to determine which direction the forest on average is trending. Protocols are in place and monitoring has begun to determine trends.

Effects on Habitat from the Travel Management Plan

Direct and Indirect Effects on Habitat

For this analysis, No Action is considered the baseline and effects are described as increases or decreases from this baseline for various indicators. It is assumed for this analysis that when a road is closed it is closed effectively such that it ceases to have impacts on the aquatic system. Seventh level Hydrologic Unit Codes (HUCs) were used for this analysis and are referred to here as "catchments." There are 388 catchments wholly or partially on the White River National Forest.

The effects of roads on aquatic organisms are well documented. A synthesis of road impact information can be found in "Forest Roads: A synthesis of scientific information" (USDA 2000). Some of the key findings from this document relating to travel management include both physical and biological effects are quoted below.

Physical Effects

- "Roads affect geomorphic process by four primary mechanisms: Accelerating erosion from the road surface and prism itself by both mass and surface erosion processes; directly affecting channel structure and geometry; altering surface flowpaths, leading to diversion or extension of channels onto previously unchannelized portions of the landscape; and causing interactions among water, sediment, and woody debris at engineered road-stream crossings."
- "Roads have three primary effects on water: they intercept rainfall directly on the road surface and road cutbanks and intercept subsurface water moving down the hillslope; they concentrate flow, either on the surface or in an adjacent ditch or channel; and they divert or reroute water from flowpaths that it would otherwise take if the road were not present."

These physical effects lead to the following biological effects:

- "Increased fine-sediment composition in stream gravel has been linked to decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes."
- "The effects of roads are not limited to those associated with increases in fine-sediment delivery to streams; they can include barriers to migration, water temperature changes, and alterations to streamflow regimes."
- "Road stream-crossings have been shown to have effects on stream invertebrates. Hawkins and others found that the aquatic invertebrate species assemblages (observed versus expected based on reference sites) were related to the number of stream crossings above a site."

- "Several studies at broad scales document aquatic habitat or fish density changes associated with road density or indices of road density."

Effects of the travel management plan were determined by analyzing three indicators: total road miles or road density by subwatershed, total road miles within 300 feet of streams or rivers by subwatershed, and number of road crossings by subwatershed. Only roads were selected for this analysis because, in general, they have greater impacts on aquatic systems than do trails because of their larger size and level of disturbance. Winter use was not analyzed because there is no associated ground disturbance.

Comparison of Alternatives

Direct and Indirect Effects

Alternative A-no action is the existing classified road system, which is out of compliance with forest plan in some locations. For all indicators, alternative A had the greatest impacts. The alternative A has 271 to 560 more road miles, 98 to 188 more road miles within 300 feet of a stream or river, and 77 to 113 more perennial stream crossings than the other action alternatives. In comparison to alternatives F and G, the alternative A has the greatest impacts to macroinvertebrate communities.

Although the alternative A has more impacts than alternatives F and G forest-wide, there are some subwatersheds in which alternative A has less impact than the other alternatives. This is generally due to potential short-term impacts due to decommissioning or rehabilitation in alternative F and the same for alternative G, plus alternative G adds some roads and trails in certain subwatersheds eventhough forest-wide there is a reduction.

Road Density

Table MIS-15 displays the total number of open roads and the forest-wide road density for all alternatives. Although road density generally decreases in each alternative, in localized areas alternative G has more miles than alternative A, making this alternative more impactive in certain watersheds. The number of catchments gaining roads and the number of miles gained are presented in Table MIS-16.

Table MIS-15. Miles of road and road density by alternative

	Alternative A	Alternative F	Alternative G
Miles of road	2610	2339	2050
Avg. road density	0.73	0.65	0.57

Roads include maintenance levels 1 though 5.

Table MIS-16. The number of subwatersheds that add or close roads and the total miles added or closed per alternative compared to the Alternative A- No Action

	Alternative F	Alternative G
# of subwatersheds with roads **added**	0	15
Miles of road **added**	0 miles	20 miles
# of subwatersheds with roads **closed**	106	172
Miles of road **closed**	254 miles	523 miles

Catchments are counted only if they add or close ¼ mile or more of road.

Roads within 300 feet of streams

The closer a road is to a stream system the greater the impacts on the stream and the organisms inhabiting it. Roads directly adjacent to streams can impact streams by channelizing the stream, eliminating streamside vegetation, and introducing sediment into the stream. Road-stream crossings are addressed separately.

Table MIS-17 displays the total miles of maintenance level 1 and 2 roads, the percent of all level 1 and 2 roads, and the proportion of roads to be closed within 300 feet of streams and rivers for all alternatives. Alternative A has the greatest length of open road within 300 feet of streams and rivers, followed by alternative F. Alternative G has the least amount of road within 300 feet of streams and rivers. The percent of the road system within 300 feet of streams and rivers is consistent in all alternatives and the roads closed near streams and rivers are proportional to the overall road distribution. There are six catchments and subwatersheds with at least 5 miles of maintenance level 1 and 2 road within 300 feet of a stream in one or more alternative (Table MIS-18).

Table MIS-7. Miles of level 1 and 2 road within 300 feet of streams and rivers and the proportion of open roads and road closures within this area

	Alternative A	Alternative F	Alternative G
Miles of Level 1 & 2 road within 300' of streams	642	544	454
% of Level 1 & 2 roads within 300' of streams	33.0%	32.5%	32.6%
% of road closures within 300' of streams	n/a	36.2%	33.9%

Road closures are changes from Alternative A.

Table MIS-18. Subwatersheds on the White River National Forest with at least 5 miles of maintenance level 1 and 2 road within 300 feet of a stream or river

Watershed Name	Alternative A	Alternative F	Alternative G
Swan River	22.2	20.1	17.6
Green Mtn Reservoir Composite watershed	10.3	10.1	6.0
Straight Creek	7.7	2.7	4.5
Upper Snake	6.9	6.5	7.2
Peru Creek	6.9	5.8	6.8
Deep Creek (Blue River)	5.8	4.1	2.8

Road miles within 300 feet are presented for all alternatives.

Number of Stream Crossings

Road-stream crossings are areas where the impacts of roads are the greatest in terms of channel impacts, sediment, and potential movement barriers. Numbers of crossings presented in this section are not accurate and may be overestimated by up to 30% due to inaccuracies in our GIS data layers. Although not all of the crossings discussed in this section are true stream crossings, if a road segment comes close enough to the stream for it to be considered a crossing, it is probably an area of acute road impacts, though not necessarily a barrier. While absolute counts of stream crossings in this analysis are not reliable, the relative differences between alternatives is considered "very good" since the same line sets were used for each alternative (the difference is whether they are open or closed). Stream crossings from maintenance level 1 and 2 roads occur in 178 (of 388) catchments. Alternative F has a 16% reduction in the number of stream crossings and Alternative G has a 29% reduction in stream crossings.

Table MIS-19. The number of maintenance level 1 and 2 road crossing by type of stream for each alternative

Type of stream	Alternative A	Alternative F	Alternative G
Perennial	407	330	294
Intermittent	1012	859	722
Swale	812	675	571

Alternative F: *Direct and Indirect Effects:* Alternative F is the existing classified road system brought into compliance with forest plan. For all indicators, alternative F was less impactive than the alternative A and more impactive than alternative G. Alternative F has 271 fewer road miles than the alternative A, and 289 more road miles than Alternative G. For roads within 300 feet of a stream or river, Alternative F has 98 fewer miles than the No Action Alternative, and 90 more miles than Alternative G. Alternative F has 77 fewer perennial stream crossings than the alternative A, and 36 more perennial stream crossings than alternative G.

Alternative G (Preferred Alternative): *Direct and Indirect Effects:* For all indicators, alternative G has the least impacts. Alternative G has 289 to 560 fewer road miles, 90 to 188 fewer road miles within 300 feet of a stream or river, and 36 to 113 fewer perennial stream crossings than the other alternatives.

In comparison to the alternative A and alternative F, alternative G has the greatest potential for stream recovery and improvement in macroinvertebrate communities.

Although at the forest scale, alternative G has fewer roads and crossings than the other alternatives, this relationship varies at the subwatershed scale. There are fifteen subwatersheds in which the impacts of alternative G are greater than alternative F and the alternative A. Therefore, while in general alternative G does the most to ensure watershed health by having the least amount of roads, road crossings, and streamside roads, in these cases alternative G is more impactive than both other alternatives.

The impacts are greatest in Indiana Creek, Battlement Creek, and the Blue River at Breckenridge composite watershed, which all add over 2 miles of new road, with the Blue River at Breckenridge adding 4.6 new miles.

Cumulative Effects

Oil and gas development, ski area expansions, vegetation management (including timber sales and prescribed fire), and grazing are all expected to continue on the White River National Forest. It is not possible to quantify the quantity, duration, or locations of these individual activities; however, they all have the potential to affect water quality and quantity and therefore aquatic macroinvertebrate habitat on the forest. Private lands adjacent to the forest are expected to continue to see development into homesites along with dramatic alterations that reduce the general health of streams by reducing infiltration, channelizing streams, and introducing fertilizers, pesticides, and other chemicals.

Suitable Habitat and Habitat Capability

Oil and gas development, ski area expansions, vegetation management (including timber sales and prescribed fire especially associated with the current bark beetle epidemic), and grazing are all expected to continue on the White River National Forest. It is not possible to quantify the quantity, duration, or locations of these individual activities, but they all have the potential to impact water quality and quantity and therefore aquatic macroinvertebrate habitat on the Forest. Private lands adjacent to the Forest are expected to continue to see development into homesites and dramatic alterations that reduce the general health of streams by reducing infiltration, channelizing streams, and introducing fertilizers, pesticides, and other chemicals.

Forest Plan Management Indicator Species Objective for Macroinvertebrate Communities

The following forest plan management indicator species objective applies to aquatic macroinvertebrates:

Conduct forest management to maintain or improve water quality (including chemical aspects as well as sediment) such that aquatic faunal communities are similar between managed and unmanaged streams.

All action alternatives of the travel management plan meet this objective. All alternatives improve the current situation by removing roads that currently exist. In the years following this decision, actions will occur to that reduce the impact of these roads. Expected treatments range from allowing a road to revegetate naturally to active recontouring. Some roads will be converted to trails. It is expected that the footprint of the travelway will be reduced when roads are converted to trails.

Overall, this project is expected to improve trends in macroinvertebrates forest-wide by reducing the impacts of roads currently existing.

The magnitude of this improvement varies by alternative, with alternative F offering the least amount of improvement and alternative G offering the greatest amount of improvement to forest-wide trends.

Monitoring

Monitoring for aquatic macroinvertebrates as a management indicator species at the forest level will continue to occur following the current protocol.

All Trout

Cutthroat, rainbow, brook, brown trout, and their hybrids are included in the trout management indicator species. Because the analysis and conclusions for trout are identical to those for aquatic macroinvertebrate communities, see the preceding section for details.

Distribution and Abundance

Trout occur in most of the perennial water bodies on the White River National Forest, including streams, rivers, lakes, and reservoirs. Trout may be excluded from some areas due to chemical contamination below mines or by natural or human-caused barriers. At high elevations, trout may be absent due to water temperature. On the White River National Forest, trend and condition are monitored in streams and rivers only and, therefore, trout in still water habitats will not be discussed further in this document.

Habitat Associations

The timing of flow, water quality, and availability of various habitat features such as deep pools, cover, and spawning gravels influence trout abundance. Geology, elevation, temperature, gradient, and substrate distribution are other factors that commonly influence trout abundance. As habitats are degraded, either by chemical pollutants, increased sediment, or unfavorable changes in flow (especially severe reductions), trout typically respond with lower abundance and poor year class distribution.

Population Trends

Forest-wide Trend Sampling

All trout were selected as a management indicator species during the 2002 forest plan revision and amendment. A monitoring protocol was developed in early 2003 and data collection began during the 2003 field season. See the description for the stratified random sampling under Aquatic Macroinvertebrates above.

There is insufficient data to determine forest-wide trends, information is available, however, to discuss status and trends associated with forest management and human interaction that could affect trout populations.

Aspects that negatively impact trout population trends include:

- Increased dispersed recreation use and increased use and expansion of developed sites such as campgrounds and ski areas is increasing sediment delivery to streams and impacting riparian vegetation.
- The recent increase in natural gas development on parts of the forest, specifically the Rifle Ranger District is potentially increasing sediment delivery to streams due to the increased level of disturbance and activity. Activity is expected on the Sopris Ranger District.
- Continued development of water for urban and other uses, including transbasin diversions, reduces instream flows.
- Spread of whirling disease and other pathogens
- Increased fishing pressure as general recreation increases
- Urban development in communities around the White River National Forest has a suite of effects including removal of riparian vegetation, introduction of chemical contaminants, creation of barriers, and increased sediment delivery.

Aspects that positively affect macroinvertebrate trends include:

- Adoption of the Watershed Conservation Practices, including:
  - Limiting disturbance in the water influence zone
  - Improving road-stream crossings with structures that minimize stream impacts and allow aquatic organism passage
- Reduced livestock grazing on National Forest System lands as allotments are vacated primarily due to the loss of base property to development.
- Increased focus on watershed improvement with a continuing effort to find and correct existing problems from ongoing activities.
- Road improvements to disconnect disturbed areas from streams to reduce sediment input

Recent forest management is considered to create a positive trend in trout populations with better protections in place and proactive projects to improve damaged areas. Growth outside the forest boundary and other aspects over which the Forest has little control like water development and natural gas development are likely to be contributing to a negative trend in localized areas. At this time, it is not possible to determine which direction the Forest on average is trending. Protocols are in place and monitoring has begun to determine trends.

Other Trout Trend Data on the White River National Forest

The Colorado Division of Wildlife sampled most streams on the White River National Forest in the late 1970s to early 1980s. Unfortunately, techniques and efficiencies vary greatly from modern sampling such that comparisons of densities cannot be made. Some discussion at the local scale is possible by looking at species compositions, but no meaningful discussion can be made with this data at the forest scale, which is the scale for this project.

Effects on Trout Habitat from the Travel Management Plan

The analysis of effects on habitat from the Travel Management Plan is identical to that for Macroinvertebrate Communities. Refer to that section for discussion of direct and indirect effects on habitat and cumulative effects. One difference of note is the effect of road crossings on fish. Road crossings may create a full or partial barrier to fish movement. Eliminating road crossings has the potential to allow fish access into previously inaccessible areas and the ability to use the local habitat more effectively. Additional stream crossings would be expected to allow passage of all aquatic organisms per forest plan and direction in the Watershed Conservation Practices Handbook.

Suitable Habitat and Habitat Capability

As discussed under Macroinvertebrate Communities, there should be no loss of habitat capability or suitable habitat for trout. It is possible that more habitat will become suitable for trout if any of the road crossings eliminated in the action alternatives are currently barriers preventing access to upstream habitat.

Forest Plan Management Indicator Species Objective for Trout

The following forest plan management indicator species objective applies to trout:

- Conduct forest management to maintain or improve the physical habitat quality for salmonids in mountain streams.

All action alternatives of the travel management plan would meet this objective. All alternatives would improve the current situation by removing roads that currently exist. In the years following this decision, actions would occur to reduce the impact of these roads. Expected treatments range from allowing a road to revegetate naturally, to active recontouring. Some roads would be converted to trails. It is expected that the footprint of the travelway will be reduced when roads are converted to trails.

Overall, this project is expected to improve trends in trout density forest-wide by reducing the impacts of currently existing roads. The magnitude of this improvement varies by alternative, with Alternative F offering the least amount of improvement and Alternative G offering the greatest amount of improvement to forest-wide trends.

Monitoring

Monitoring for trout as a management indicator species at the forest level will continue to occur following the current protocol.

APPENDIX D: ACRONYMS AND GLOSSARY

Acronyms

ADP	Application for Permit to Drill
AMS	Analysis of the Management Situation
ATV	all-terrain vehicle
BA	biological assessment
BE	biological evaluation
BLM	Bureau of Land Management
CDNST	Colorado Divide National Scenic Trail
CDOW	Colorado Division of Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DAU	data analysis unit
DEIS	draft environmental impact statement
EIS	environmental impact statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESI	existing scenic integrity
FEIS	final environmental impact statement
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
FSV	full-sized vehicle
GIS	geographic information system
GMU	game management unit
HABCAP	habitat capability computer model program
HRV	historic range of variability
HUC	hydrologic unit code
IDT	interdisciplinary team
IRI	integrated resource inventory
IWM	Integrated Noxious Weed Management
LAU	lynx analysis unit
LRMP	land and resource management plan
LSAA	late successional assessment area
MA	management area
MCB	Monitoring Colorado Birds program
MIC	management indicator communities
MIS	management indicator species
MBF	thousand board feet
MDP	master development plan
MMBF	million board feet
MMCF	million cubic feet
MRVD	million recreation visitor days
MVUM	motor vehicle use map
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NF	National Forest
NFMA	National Forest Management Act
NFS	National Forest System
NFSR	National Forest System road
NFST	National Forest System trail
NOI	notice of intent
NRHP	National Register of Historic Places
NRT	National Recreation Trail
NST	National Scenic Trail
NTSA	National Trail System Act
NVUM	National Visitor Use Monitoring Survey
NWSRS	National Wild and Scenic Rivers System
NWPS	National Wilderness Preservation System
OHV	off-highway vehicle
PAOT	persons at one time
PEIS	programmatic environmental impact statement
P/J	pinyon-juniper
RIM	Recreation Information Management
RMRIS	Rocky Mountain resource inventory system
RNA	research natural area
ROD	record of decision
ROS	Recreation Opportunity Spectrum
RMBO	Rocky Mountain Bird Observatory
RPA	Forest and Rangeland Renewable Resources Planning Act
RVD	recreation visitor day
SIA	special interest area
SMS	Scenery Management System
SIO	scenic integrity objective
SUPO	Surface Use Plan of Operations
TCP	Traditional Cultural Property
TES	threatened and endangered species
TMP	White River National Forest Travel Management Plan
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
WCP	watershed conservation practices

Glossary

access	The opportunity to approach, enter and make use of public or private land.
access rights	A privilege or right of a person or entity to pass over or use another person's or entity's travel way.
acre-foot	The amount of water covering one acre to a depth of one foot.
activity	A measure, course of action, or treatment that is undertaken to directly or indirectly produce, enhance, or maintain forest and rangeland outputs or achieve administrative or environmental quality objectives.
activity area	An area of land affected by a management activity or activities. An activity area can range from a few acres to an entire watershed depending on the type of monitoring being conducted.
adaptive management	A type of natural resource management in which decisions are made as part of an ongoing process. Adaptive management involves testing, monitoring, evaluation, and incorporating new knowledge into management approaches based on scientific findings and the needs of society. Results are used to modify management policy.
affected environment	The biological and physical environment that will or may be changed by proposed actions and the relationship of people to that environment.
air pollution	Any substance or energy form (heat, light, noise, etc.) that alters the state of the air from what would naturally occur.
airshed	Basic geographic units in which air quality is managed.
allocation	The assignment of a land area to a particular use or uses to achieve management goals and objectives.
allotment	A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System lands.
allowable sale quantity (ASQ)	The amount of chargeable timber volume that can be sold from the area of suitable land covered by the forest plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the “average annual allowable sale quantity.”
all-terrain vehicle (ATV)	Any motorized, off-highway vehicle 50 inches or less in width, having a dry weight of 800 pounds or less that travels on three or more low-pressure tires with a seat designed to be straddled by the operator.
alluvial	Of or pertaining to sand, mud, and other sediments deposited on land by streams.
alpine	Those portions of mountains that rise above the cold limits of trees.
alternative	A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decision making. An alternative need not substitute for another in all respects.

analysis area	One or more capability areas combined for the purpose of analysis in formulating alternatives and establishing various impacts and effects.
annual maintenance	Work performed to maintain serviceability or to repair failures during the year in which they occur. Includes preventive and/or cyclic maintenance performed in the year in which it is scheduled to occur.
aquatic ecosystem	An ecosystem (biological and physical components and their interactions) in which water is the principal medium. Examples include wetlands, streams, reservoirs, and areas with plants or animals characteristic of either permanently or seasonally inundated soils.
arc	A line defined as a set of ordered x, y coordinates used to represent linear features and polygon boundaries.
arterial road	Provides service to large land areas and usually connects with public highways or other arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service. It usually is developed and operated for long-term land and resource management purposes and constant service.
aspect	(1) The visual first impression of vegetation or a landscape at a particular time or as seen from a specific point; (2) the predominant direction of slope of the land; (3) seasonal changes in the appearance of vegetation.
attribute column	A field within a database table.
attenuated flooding	Flooding lessened in severity because of natural or man-made structures or areas that disperse water or slow flows.
available lands	Those portions of a national forest not administratively excluded from timber harvest or livestock grazing or other activities.
background	A term used in visual management to describe that part of a scene or landscape that is farthest from the viewer, usually 3 miles to infinity from the observer.
benchmark	Reference points that define the bounds within which feasible management alternatives can be developed. Benchmarks may be defined by resource output or economic measures.
big game	Certain wildlife that may be hunted for sport under state laws and regulations, including elk, pronghorn antelope, mule and white-tail deer, turkey and bighorn sheep.
biogeography	The study of the geographic distribution of plants and animals.
biodiversity	The full variety of life in an area, including the ecosystems, plant and animal communities, species and genes, and the processes through which individual organisms interact with one another and their environments.
biological assessment	A biological assessment evaluates the potential effects of an action on listed and proposed species under the Endangered Species Act and on designated and proposed critical habitat. A biological assessment also determines whether any such species or habitat is likely to be adversely affected by the action. An assessment is used in determining whether formal consultation or a conference is necessary.

biological evaluation	A review of all Forest Service planned, funded, executed or permitted programs and activities for possible effects on regionally listed sensitive species. A biological evaluation may be used or modified to satisfy consultation requirements for biological assessments of construction projects requiring an environmental impact statement.
biological opinion	An official report by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service issued in response to a formal Forest Service request for consultation or conference. It states whether or not the federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.
biomass	The total amount of living plants and animals above and below ground in an area at a given time.
board foot	The amount of wood contained in an unfinished board one inch thick, 12 inches long and 12 inches wide (2.54 x 30.5 x 30.5 cm).
browse	Twigs, leaves, and young shoots of trees and shrubs upon which animals feed; in particular, those shrubs that are used by livestock and big-game animals for food.
buffer zone	An area on the edge of protected areas with restrictive land-use controls allowing only activities compatible with protection of the core area, such as research, environmental education, recreation and tourism.
Bureau of Land Management (BLM)	An agency in the U.S. Department of the Interior responsible for administering public lands.
canopy cover	The percentage of the ground covered by a vertical projection of the natural spread of the branches and leaves of the trees in an area.
carrying capacity	The maximum number of animals that can be supported in a given environment without deteriorating that environment.
cave	Any naturally formed void, cavity, recess or system of interconnected passages that occur beneath the surface of the earth or within a cliff or ledge, including natural subsurface water and drainage systems large enough to permit a person to enter, whether or not the entrance is naturally formed or created by humans. The term “cave” also includes any natural pit, sinkhole or other feature that is an extension or component of a cave.
ceded lands	Lands that tribes ceded to the U.S. by treaty in exchange for reservation of specific land and resource rights, annuities and other promises in the treaties.
channel	A passage, either naturally or artificially created, that periodically or continuously contains moving water, or that forms a connecting link between two bodies of water. River, creek, run, branch and tributary are some of the terms used to describe natural channels. Natural channels may be single or braided. Canal and floodway are some of the terms used to describe artificial channels.
class I area	All international parks, national parks larger than 6,000 acres, and designated wilderness areas larger than 5,000 acres that existed on August 7, 1977, are considered class 1 areas. The 1977 Clean Air Act amendments provide the most protection to these pristine lands, severely limiting the amount of additional air pollution that can be added to these areas.

class II area	A geographic area designated by Congress for a moderate degree of protection from future air quality degradation. Moderate increases in new pollution may be permitted in class II areas. All wilderness designated after August 7, 1977, are automatically class II areas, as are all other National Forest System lands (except additions to existing class I areas).
climax	(1) The final or stable biotic community in a successional series that is self-perpetuating and in dynamic equilibrium with the physical habitat; (2) the assumed end point in succession.
closed road	An intermittent service road in maintenance level 1 that is closed to all vehicular traffic for more than 1 year.
collector road	A road that serves smaller land areas than a forest arterial road and usually is connected to a forest arterial road or public highway. Collects traffic from forest local roads and/or terminal facilities. The location and standard are influenced both by long-term multi-resource service needs and by travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.
commercial timber sale	The selling of timber from National Forest System lands for the manufacture of commercial products, such as lumber, plywood, etc.
commercially valuable species	Tree species that are used in the production of wood products and are often bought by purchasers within the White River National Forest's regional timber market. The list of commercially valuable species is subject to change over time depending on the market supply and demand for individual species. The White River National Forest's current list includes Englemann spruce, subalpine fir, Douglas-fir, lodgepole pine, ponderosa pine, and aspen.
composition	The proportion of each tree species in a stand expressed as a percentage of either the total number, basal area, or volume of all tree species in the stand.
concessionaire	A special-use permittee who provides goods and services primarily at Forest Service developed sites (excluding ski areas).
conflict	Goal interference attributed to another's behavior.
conformity determination	An area conforms to air quality standards as determined by the Environmental Protection Agency or state or local entity.
connected disturbed areas	High runoff areas like roads and other disturbed sites that discharge surface runoff into a stream or lake.
connectivity	The arrangement of habitats that allows organisms and ecological processes to move across the landscape. Patches of similar habitats are close together or linked by corridors of appropriate vegetation. The opposite of fragmentation.
construction	The erection, construction, installation, or assembly of a new fixed asset. The supervising, inspecting, actual building, and all expenses incidental to the development of a new facility, including locating, surveying, mapping, costs and acquisition of rights-of-way and elimination of hazards.

consultation	(1) An active, affirmative process that (a) identifies issues and seeks input from appropriate American Indian governments, community groups and individuals; and (b) considers their interests as a necessary and integral part of the BLM and Forest Service decision-making process. (2) The federal government has a legal obligation to consult with American Indian tribes. This legal obligation is based on such laws as Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act and numerous other executive orders and statutes. The legal responsibility is, through consultation, to consider Indian interests and account for those interests in the decision. (3) Consultation also refers to a requirement under Section 7 of the Endangered Species Act for federal agencies to consult with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service with regard to federal actions that may affect listed threatened or endangered species or critical habitat.
cooperating agency	Any federal agency other than the lead agency that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major federal action significantly affecting the quality of the human environment.
cost	The negative or adverse effects or expenditures resulting from an action. Costs may be monetary, social, physical or environmental in nature.
cost efficiency	The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values but are achieved at specific levels in the least cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates of return may be appropriate.
coverage	An Arc/Info term for a collection of similar spatial features organized within a GIS. It generally represents a single set of geographic objects such as roads. A coverage supports the georelational model—it contains both the spatial (location) and attribute (descriptive) data for geographic features.
cover type	A descriptive classification of vegetation based on the present dominant tree species.
critical habitat	Habitat of federally listed threatened or endangered species where those physical and biological features essential to conservation of the species are found and which may require special management considerations or protection. This habitat may currently be occupied or determined by the Secretary of the Interior to be essential for areas outside the species' current range.
cubic foot	A unit of true volume that measures 1 x 1 x 1 foot (30.48 x 30.48 x 30.48 centimeters).
cumulative impact	The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.
culvert	A conduit or passageway under a road, trail, or other obstruction. A culvert differs from a bridge in that it is usually constructed entirely below the elevation of the traveled way.

decommission	Activities that result in the stabilization and restoration of unneeded roads or trails to a more natural state. The road or trail is permanently removed from the transportation system. The activities range from blocking the entrance, scattering boughs on the roadbed, revegetating and water barring, to removing fills and culverts, reestablishing drainage-ways, pulling back shoulders, and recontouring the slopes for full obliteration.
design capacity	The maximum theoretical amount of use a developed recreational site was built to accommodate. This is usually expressed in PAOTs (persons at one time).
designated OHV route or area	A National Forest System road, a National Forest System trail, or an area on National Forest System lands that is designated for motor vehicle use pursuant to §212.51 in a use map.
designated route	A route that has been designated for a particular use or type of traffic such as a scenic byway, a groomed snowmobile trail, a road for high clearance vehicles, a trail for mountain bikes, etc. Routes may be designated by an order, act of Congress, state legislature, Forest Service decision, or NEPA decision. Designated routes may have either the “allow” strategy or the “encourage” strategy.
desired future condition	A portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.
developed recreation	This type of recreation is dependent upon facilities provided to enhance recreation opportunities in concentrated-use areas. Examples include campgrounds and ski areas. Facilities in these areas might include roads, parking lots, picnic tables, drinking water, toilets, ski lifts, and buildings.
developed recreation sites	Relatively small, distinctly defined areas where facilities are provided for concentrated public use, such as campgrounds, picnic areas and swimming beaches.
direct effects	Environmental effects caused by an action and that occur at the same time and place.
dispersed campsite	An individual/family-sized campsite that has a general size of about 600–750 square feet. It includes a hardened area around a fire pit, a barren area, and/or user-constructed facilities.
dispersed recreation	Those forest, range, or desert-oriented outdoor recreation activities that normally take place outside of sites or areas that are developed or managed to concentrate recreational use. Dispersed recreation activities may require facilities for safeguarding visitors, protecting resources, and enhancing the quality of visitor experiences.
district ranger	The official responsible for administering the National Forest System lands on a ranger district.
disturbance	An event that causes a significant change from the normal pattern in an ecological system. Disturbances are often subdivided into natural disturbances and man-caused disturbances.
diversity	The distribution and abundance of different plant and animal communities and species within the area covered by a forest plan. This term is derived from the National Forest Management Act (NFMA). It is not synonymous with “biodiversity.”
draft environmental impact statement (DEIS)	The statement of environmental effects required for major federal actions under Section 102 of the National Environmental Policy Act and released to the public and other agencies for comment and review.

easement	A special-use authorization for a right-of-way that conveys a conditioned interest in National Forest System land and is compensable according to its terms.
ecosystem	A functional unit consisting of all the living organisms (plants, animals, and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size—a log, pond, field, forest or the earth's biosphere—but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation; for example, forest ecosystem or range ecosystem.
ecosystem composition	The plant and animal species and communities in the plan area.
ecosystem structure	The biological and physical attributes that characterize ecological systems.
ecotone	A transition area between two adjacent ecological communities usually exhibiting competition between organisms common to both.
elk security habitat	An area whose geography, topography, vegetation, or a combination of those features will hold elk during periods of stress. .
endangered species	A taxonomic group of organisms in danger of extinction throughout all or a significant portion of its range.
environmental assessment (EA)	A document that discloses the environmental impacts to be expected from a proposed action and from specific alternatives to the proposed action. An EA is prepared when significant environmental impacts are not anticipated or when there is a question as to the extent of the impacts. Comments are accepted within 30 days of release of an EA, and are considered before a final decision is made. Responses to comments appear in an appendix to the EA.
environmental impact statement (EIS)	A formal public document prepared to analyze the impacts on the environment of a proposed project or action and released for comment and review. An EIS is prepared, instead of an EA, when significant environmental impacts are anticipated. Comments by the public and by other agencies are accepted within 90 days after the release of a Draft EIS, and are considered before the final decision is documented in a Final EIS. Responses to comments appear in an appendix to the Final EIS.
essential habitat	Essential habitat is designated by a Regional Forester. It possesses the same characteristics as critical habitat without having been declared as critical habitat by the Secretary of the Interior or Commerce. The term includes habitats necessary to meet recovery objectives for endangered, threatened, and proposed species and those necessary to maintain viable populations of sensitive species.
exotic species	Non-native fish, wildlife or plant species that were deliberately or accidentally introduced in an ecosystem and that have become permanently established.
extirpated	A species that has become locally extinct; a species or subspecies that has disappeared from a locality or region without becoming extinct throughout its entire range.
federal recognition	Acknowledgement of an Indian tribe as a government entity that has a special relationship with the U.S. government. This relationship recognizes that Indian tribes receive some rights not available to other citizens; for example, health and education benefits from the trust relationship or off-reservation hunting and fishing rights related to treaties with tribal governments.

federally recognized Indian tribes	An Indian group for which: (1) Congress or an executive order created a reservation for the group either by treaty (before 1871), statutory expression, agreement by executive order, or other valid administrative action; and (2) the U.S. has some continuing political relationship, such as providing services through the Bureau of Indian Affairs.
fire management	The activities concerned with the protection of people, property and forest areas from wildfire and the use of prescribed burning for the attainment of forest management and other land use objectives, all conducted in a manner that considers environmental, social and economic criteria.
forest road	Any road that is wholly or partly within, or adjacent to, and serving the National Forest System and that is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.
forest trail	Any trail wholly or partially within, adjacent to, and serving national forests and other areas.
forest highway	A designated forest road under the jurisdiction of and maintained by a public authority that is subject to the Highway Safety Act.
forest land not suitable for timber production	Lands not selected for timber production in a forest plan alternative because: (a) the multiple-use objectives for the alternative preclude timber production; (b) other management objectives for the alternative limit timber production activities to the point at which it is not possible to meet management requirements set forth in 36 CFR 219.27; or (c) the lands are not cost-efficient, over the planning horizon, in meeting forest objectives that include timber production. In the preferred alternative and forest plan, lands not appropriate for timber production are designated as unsuitable.
forest system transportation management	The planning, inventory, analysis, classification, record keeping, scheduling, construction, reconstruction, maintenance, decommissioning, and other operations undertaken to achieve environmentally sound, safe, and cost-effective access for use, protection, administration, and management of National Forest System lands.
forest visitor map	A map that provides detailed information about a national forest. It is to be used by the forest visitor and those interested in specific activities such as driving, camping, hunting, or other recreational activities.
four-season resort	Any recreation facility on National Forest System lands permitted to operate during more than one season of the year. Resorts with either a winter or summer emphasis may be authorized for facilities to remain open to allow additional recreational use during alternative seasons. Permit holders who operate ski-based facilities during the winter season and permit holders with summer-based resorts with overnight lodging normally are assigned responsibility for public safety and resource protection and are required to manage their permit area 365 days per year.
fragmentation	The process of transforming large continuous patches of similar vegetation into one or more smaller patches surrounded by disturbed areas. This may occur naturally through such agents as fire, landslides, windthrow and insects and disease, or through development action of humans. The primary distinction between fragmentation and perforation is in scale; fragmentation impacts usually are large in scale and may inhibit or prevent one or more species from moving from one patch of suitable habitat to another.
geographic information system	Computer software that links geographic information (where things are) with descriptive information (what things are).

habitat	The place where an organism lives and/or the conditions of that environment, including the soil, vegetation, water, and food.
habitat capability	The capability of a given habitat to meet the needs of species, either seasonally or year-round.
habitat effectiveness	Percentage of available habitat that is usable by elk during the non-hunting season. This includes habitat that is considered cover and forage, and is measured against the effects of roads.
historic range of variability	The natural fluctuation of components of healthy ecosystems over time. Refers to the range of conditions and processes that are likely to have occurred prior to settlement of the project area by people of European descent (approximately the mid-1800s), which would have varied within certain limits over time. Historical conditions and processes portrayed include such variables as forest or grassland vegetation types, compositions, and structures; fish and wildlife habitats and populations; and drought, grazing, and fire regimes.
hydrologic unit code (HUC)	Divides watersheds into a series of progressively smaller nested levels, with the first level being the largest land area relative to higher-numbered levels in that watershed. Each level is identified systematically by a hydrologic unit code number. A first-level watershed can be divided into a number of second-level watersheds; each second-level watershed may be further subdivided into third-level watersheds, and so forth.
Indian land	Any land in collective tribal holding or ownership for which the Secretary of the Interior has a continuing trust responsibility to manage for the benefit of the respective tribe. In the past, this term described certain parcels or areas where Indians lived and represented a smaller concept than Indian territory.
Indian territory	Unsurveyed lands that were recognized by the federal government to be occupied or used by Indians. Prior to the U.S. Constitution, lands occupied or used by American Indians were referred to as “Indian Territory.” Historical documents dating back to the 16th century refer to these unsurveyed regions as a “territory.”
infrastructure	The facilities, utilities and transportation systems needed to meet public and administrative needs.
jurisdiction	The legal right to control or regulate use of a transportation facility. Jurisdiction requires authority but not necessarily ownership. The authority to construct or maintain a road may be derived from fee title, an easement, an agreement, or other method. Forest Service jurisdiction includes National Forest System roads and National Forest System trails, which are roads or trails located on National Forest System lands, other than a road or trail: that has been authorized by a legally documented right-of way held by a state, county, or local public road authority; or that an authorized officer has ascertained, for administrative purposes and based on available evidence, is within a public right-of way for a highway, such as a right-of-way for a highway pursuant to R.S. 2477.
karst	A type of landform that develops when soluble rocks (such as limestone, dolomite, gypsum, anhydrite, and halite) are dissolved. A karst landscape is characterized by well-developed subsurface drainage, collapse features such as sinkholes, dry valleys, vertical shafts, caves, and fluted rock surfaces (epikarst).
land exchange	A discretionary, voluntary transaction involving mutual transfers of land or interests in land between the Secretary of Agriculture acting by or through the Forest Service and a non-federal entity.

landscape — A heterogeneous land area composed of a cluster of interacting ecosystems that are repeated in similar form throughout. Landscapes vary in size, down to a few kilometers in diameter.

landscape ecology — The study of the distribution patterns of communities and ecosystems, the ecological processes that affect those patterns, and changes in pattern and process over time.

lentic — Standing water habitat such as lakes, ponds, seeps, bogs and meadows (wet).

lifeways — Manner and means by which a group of people lives—their way of life. Components include language, subsistence strategies, religion, economic structure, physical mannerisms, and shared attitudes.

limits of acceptable change (LAC) — A framework for establishing acceptable and appropriate resource and social conditions in recreation settings.

lithic — Stone used as raw material for the production of artifacts, such as tools or other utilitarian objects. It may also be used strictly for ceremonial purposes.

local road — Connects terminal facilities with forest collector or forest arterial roads or public highways. The location and standard are usually controlled by topography and a specific resource activity rather than travel efficiency. Forest local roads may be developed and operated for long-term, intermittent, or short-term service.

lotic — Running water habitat such as rivers, streams and springs.

lynx analysis unit (LAU) — The LAU is a project analysis unit upon which direct, indirect, and cumulative effects analyses are performed. LAU boundaries should remain constant to facilitate planning and allow effective monitoring of habitat changes over time. An area of at least the size used by an individual lynx, about 25–50 square miles.

lynx habitat — Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare. Lynx records occur predominantly in the following vegetation types: In the western U.S. lodgepole pine, subalpine fir, Engelmann spruce, and aspen cover types on subalpine fir habitat types; cool, moist Douglas-fir, grand fir, or western larch forest, where they are interspersed with subalpine forests, also provide habitat for lynx. In the Southern Rocky Mountain Geographic Area, mature and late-successional spruce/fir forests, provide structure and forage that is superior to mature lodgepole pine forests. (Many parts of the southern Rockies currently have a shortage of regenerating lodgepole pine stands.) In the absence of widespread regenerating forest stands, mature and late-successional spruce-fir forests may constitute some of the most important habitat for lynx. These stands not only provide components necessary for denning habitat, but also produce red squirrels, grouse, and snowshoe hares. Although these forest types may support a lower density of hares than do densely regeneration stands, they also likely provide stable populations of both hares and red squirrels over time.

lynx denning habitat — Habitat used during parturition and rearing of young until they are mobile. The common component appears to be large amounts of coarse woody debris, either down logs or root wads. (In some studies this was estimated at greater than 80 downed logs per acre, but it could be less if properly arranged.) Coarse woody debris provides escape and thermal cover for kittens. Denning habitat may be found either in older mature forest of conifer or mixed conifer/deciduous types, or in regenerating stands (greater than 20 years since disturbance). Denning habitat must be located within daily travel distance of foraging habitat (typical maximum daily distances for females is 3–6 miles).

lynx diurnal security habitat	In lynx habitat, areas that provide secure winter daytime bedding sites for lynx in highly disturbed landscapes; for example, large developed winter recreational sites or areas of concentrated winter recreational use. It is presumed that lynx may be able to adapt to the presence of regular and concentrated human use during winter, so long as other critical habitat needs are being met and security habitat blocks are present and adequately distributed in such disturbed landscapes. Security habitat will provide lynx the ability to retreat from human disturbance during winter daytime hours and to emerge at dusk to hunt when most human activity ceases. Security habitats generally will be sites that naturally discourage winter human activity because of extensive forest floor structure, or stand conditions that otherwise make human access difficult; security habitat should be protected to the degree necessary. Security habitats are likely to be most effective if they are sufficiently large enough to provide effective visual and acoustic insulation from winter human activity and easily allow movement away from infrequent human intrusion. These winter habitats must be distributed such that they are in proximity to foraging habitat.
lynx foraging habitat	Habitat that supports primary prey (snowshoe hare) and/or important alternate prey (especially red squirrels) that are available to lynx. The highest quality snowshoe hare habitats are those that support a high density of young trees or shrubs (greater than 4,500 stems or branches per acre from studies done in the Northern Rocky Mountain Geographic Area, but estimated at 1,000 to 2,000 stems per acre in the lodgepole pine and spruce/fir forests in the Southern Rocky Mountain Geographic Area), tall enough to protrude above the snow. These conditions may occur in early successional stands following some type of disturbance, or in older forests with a substantial understory of shrubs and young conifer trees. Coarse woody debris, especially in early successional stages (created by harvest regeneration units and large fires), provides important cover for snowshoe hares and other prey. Red squirrel densities tend to be highest in mature cone-bearing forests with substantial quantities of coarse woody debris.
lynx habitat connectivity (landscape)	Cover (vegetation) in sufficient quantity and arrangement to allow for the movement of lynx. Narrow forested mountain ridges or shrub-steppe plateaus may provide a linkage between more extensive areas of lynx habitat. Wooded riparian communities may provide travel cover across otherwise open valley floors between mountain ranges; lower elevation ponderosa pine or pinyon-juniper woodlands may link high-elevation spruce/fir forests.
lynx habitat currently in unsuitable condition	Areas within identified/mapped lynx habitat that are in early successional stages as a result of recent fires or vegetation management, in which the vegetation has not developed sufficiently to support snowshoe hare populations during all seasons. Management-created openings would likely include clearcuts and seed tree harvest units and might include shelterwood and commercially-thinned stands depending on unit size and remaining stand composition and structure.
lynx habitat matrix	Matrix is defined as the most extensive and most connected landscape element type present, which plays the dominant role in landscape functioning. A landscape surrounding a patch. For lynx, this is an area that is predominantly lynx habitat but because of natural fragmentation also includes stringers or isolated patches of vegetation such as aspen, riparian areas, sagebrush, grasslands, or alpine. These stringers or patches may have value to lynx for alternate prey species or travelways. Activities in these areas could have effects on adjacent lynx habitat.
lynx unsuitable habitat areas	Areas such as lakes, low-elevation ponderosa pine forest, and alpine tundra that do not support snowshoe hare populations and are not considered to be capable of providing lynx habitat. See also *lynx habitat currently in unsuitable condition*.
lynx key linkage areas	Critical areas for lynx habitat. Usually, the factors that place connectivity at risk are highways or private land developments. Special management emphasis is recommended to maintain or increase the permeability of key linkage areas.

maintenance	The act of keeping fixed assets in acceptable condition. It includes preventive maintenance normal repairs, replacement of parts and structural components, and other activities needed to preserve a fixed asset so that it continues to provide acceptable service and achieves its expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from or significantly greater than those originally intended. Maintenance includes work needed to meet laws, regulations, codes, and other legal direction as long as the original intent or purpose of the fixed asset is not changed. The upkeep of the entire forest development transportation facility including surface and shoulders, parking and side areas, structures, and such traffic-control devices as are necessary for its safe and efficient utilization.
maintenance level	Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria. Operational is the current status. Objective is what is intended for the future.
maintenance level 1	Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resource to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are “prohibit” and “eliminate”. Roads receiving level 1 maintenance may be of any type, class, or construction standard and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic but may be open and suitable for non-motorized uses.
maintenance level 2	Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration, 4x4 traffic is often recommended. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either (1) discourage or prohibit passenger cars or (2) accept or discourage high-clearance vehicles.
maintenance level 3	Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either “encourage” or “accept.” “Discourage” or “prohibit” strategies may be for certain classes of vehicles or users.
maintenance level 4	Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust-abated. The most appropriate traffic management strategy is “encourage.” However, the “prohibit” strategy may apply to specific classes of vehicles or users at certain times.
maintenance level 5	Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane, paved facilities. Some may be aggregate surfaced and dust-abated. The appropriate traffic management strategy is “encourage.”
management indicator community	Management indicator communities are important habitats that are selected to predict the likely effects of management actions that are identifiable, measurable, and predictable and can be related to habitat of associated species.

management indicator species	Includes the following endangered and threatened species identified on state and federal lists for the planning area: species with special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished or trapped; and additional species selected because their population changes are believed to indicate effects of management activities on other species of a major biological community or on water quality.
map scale	The ratio of the distance on a map to the distance on the earth. It is typically expressed as a fraction (such as 1:24,000; this means that 1 unit on the map equals 24,000 units on the ground).
mature forest	Generally used in an economic sense to indicate that a forest has attained harvest age.
mechanized vehicle	Any contrivance that provides mechanical assistance and has moving parts for the purpose of transporting one or more people across land or water and that is powered by a living or non-living power source. Examples include wagons, bicycles, rollerblades, and paddle-wheeled watercraft. Not included are wheel chairs when used as a necessary medical appliance. Also not included are skis, snowshoes, rafts, canoes, sleds, travois, or similar devices without moving parts.
motor vehicle	Any vehicle that is self propelled, other than a vehicle operated on rails; and any wheelchair or mobility device including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion and that is suitable for use in an indoor pedestrian area.
National Environmental Policy Act (NEPA)	An act declaring a national policy to encourage productive harmony between people and their environment, to promote efforts that will prevent or eliminate damage to the environment and the biosphere and simulate the health and welfare of people, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality.
National Forest Management Act (NFMA)	A law passed in 1976 amending the Forest and Rangeland Renewable Resources Planning Act; NFMA requires the preparation of regional and forest plans and the preparation of regulations to guide that development.
National Forest System (NFS) lands	Federal lands designated by executive order or statute as national forests, national grasslands, or purchase units, or other lands under the administration of the U.S. Forest Service.
National Forest System road	A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority.
National Forest System trail	A forest trail other than a trail which has been authorized by legally documented right-of-way held by a State, county or other local public road authority.
National Recreation Trails	Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the national system of trails authorized by Section 4 of the National Trails System Act in or reasonably accessible to urban areas.
National Register of Historic Places (NHRP)	A list of heritage resources that have local, state, or national significance maintained by the Secretary of the Interior.
National Wild and Scenic River System	Rivers with outstanding scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values designated by Congress under the Wild and Scenic Rivers Act for preservation of their free-flowing condition. See also *wild, scenic, and recreational rivers*.

National Wilderness Preservation System	All lands covered by the Wilderness Act and subsequent wilderness designations, irrespective of the department or agency having jurisdiction.
natural appearing landscapes	Whether naturally evolved, or culturally established, the landscape appears natural.
natural regeneration	The establishment of a plant or a plant age class from natural seeding, sprouting, suckering, or layering.
new road construction	Activity that results in the addition of forest or temporary road miles.
No-action alternative	An alternative that maintains established trends or management direction.
non-forested area	Lands never having or incapable of having 10 percent or more of the area occupied by forest trees, or lands previously having such cover and currently developed for non-forest use.
non-motorized activities	Activities that do not incorporate the use of a motor, engine or other non-living power source. Excluded by this classification would be such machines as aircraft, hovercraft, motorboats, automobiles, motor bikes, snowmobiles, bulldozers, chainsaws, rock drills and generators.
non-system road or trail	See *unauthorized road or trail*.
notice of intent	Formal notification that an environmental impact statement will be prepared and considered. The notice briefly describes the proposed action and possible alternatives, the agency's scoping process, and the address and name of the agency to contact regarding questions about the proposed action and the environmental impact statement.
noxious weed	An alien plant that aggressively invades or is detrimental to native plant communities. The direct or indirect effect of the presence of this plant is detrimental to environmentally sound management of natural ecosystems.
obliteration	The act of eliminating the functional characteristics of a travelway and the reestablishment of natural resource production capability. The intent is to make the corridor unusable as a road or a trail and stabilize it against soil loss.
off-highway vehicle (OHV)	As defined by Colorado Revised Statute 33-14.5-101: "any self-propelled vehicle which is designed to travel on wheels or tracks in contact with the ground, which is designed primarily for use off of the public highways, and which is generally and commonly used to transport persons for recreational purposes. *Off-highway vehicle* does not include the following: (a) vehicles designed and used primarily for travel on, over or in the water; (b) snowmobiles; (c) military vehicles; (d) golf carts; (e) vehicles designed and used to carry disabled persons; (f) vehicles designed and used specifically for agricultural, logging or mining purposes."
open road density	See *road density.*
outfitter/guide	A special-use permittee who provides all commercial outfitting operations involving services for accommodating guests, transporting persons, and providing equipment, supplies, and materials. The permittee also provides guiding activities wherein the guide furnishes personal services or serves as a leader or teacher.
over-snow vehcile	A vehicle that is designed for use over snow and that runs on ta track or tracks and /or a ski or skis, while in use over snow. The vehicle is primarily designed for over-snow use, not retrofitted for over-snow use.

paleontological area	A unit of land that contains fossils of plants and animals, shellfish, early vertebrates, coal swamp forests, early reptiles, dinosaurs, and other prehistoric plants and animals.
particulates	Small particles suspended in the air and generally considered pollutants.
patented mining claim	A parcel of land originally claimed under the Mining Law of 1872 for which title has now passed from the federal government to the mining claimant. A patented mining claim is private land.
permit	A special-use authorization that provides permission, without conveying an interest in land, to occupy and use National Forest System lands or facilities for specific purposes, and which is both revocable and terminable.
persons at one time (PAOT)	A recreational capacity measurement term indicating the number of people who can use a facility or area at one time.
planning area	The area of the National Forest System, including national grasslands, covered by a regional or forest plan.
planning criteria	Standards, tests, rules, and guidelines by which the planning process is conducted and upon which judgments and decisions are based.
planning records	Documents and files that contain detailed information and decisions made in developing the forest plan. Available at the forest supervisor's office.
plant association	The distinctive combination of trees, shrubs, grasses, and herbs occurring in a theoretical terminal or climax community or series of communities.
plant community	A grouping of plants that have reached dynamic equilibrium with the local environmental conditions and is equivalent to climax. On site, there is no evidence of replacement by other dominant plant species and there is no evidence of serious disturbances.
prescribed burning	Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions, that allows the fire to be confined to a predetermined area and, at the same time, to produce the fireline intensity and rate of spread required to attain planned resource management objectives. Also called *management-ignited*.
prescribed fire	A fire burning within prescription, resulting from planned or unplanned ignition.
primitive	See *recreation opportunity spectrum*.
private road	A road under private ownership authorized by easement to a private party, or a road that provides access pursuant to a reserved or private right.
proposed action	In terms of the National Environmental Policy Act, the project, activity, or action that a federal agency intends to implement or undertake and that is the subject of an environmental analysis.
proposed species	Any species of fish, wildlife, or plant that is proposed by the U.S. Fish and Wildlife Service or the National Oceanographic and Atmospheric Administration (NOAA) to be listed as threatened or endangered.
public	The people of an area, state, or nation that can be grouped together by a commonality of interests, values, beliefs, or lifestyles.
public access	Usually refers to a road or trail route over which a public agency has secured a right-of-way for public use.

public involvement	A Forest Service process designed to broaden the information base upon which agency decisions are made by (1) informing the public about Forest Service activities, plans and decisions; and (2) encouraging public understanding about participation in the planning processes that lead to final decision-making.
public issue	A subject or question of widespread public interest identified through public participation relating to management of National Forest System lands.
public-private ventures	Opportunities for private, profit-oriented businesses to invest in the development of campgrounds and other appropriate facilities on National Forest System lands.
range	Land supporting indigenous vegetation that is grazed or that has the potential to be grazed and that is managed as a natural ecosystem.
range allotment	A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System lands and other associated lands administered by the Forest Service.
rangeland	Lands on which the native vegetation is predominately grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing usage. Includes lands revegetated naturally or artificially to provide a forage cover that is managed like native vegetation.
ranger district	Administrative subdivision of a national forest supervised by a district ranger who reports to a forest supervisor.
reclamation	Returning disturbed lands to a form and productivity that will be ecologically balanced, often in conformity with a predetermined reclamation plan.
reconstruction	Construction activities performed on an existing facility. Reconstruction includes those activities that alter the facility from its originally constructed or subsequently reconstructed condition.
recontouring	Obliteration of a road or trail by means of decompaction, reestablishment of sub-surface flow, debris and rock placements, treatments to gullies and to their connectivity to stream systems, vegetation plantings, seeding, mulching, reestablishing original contours or removal of drainage structures.
record of decision (ROD)	A document separate from but associated with an environmental impact statement that publicly and officially discloses the responsible official's decision on the proposed action.
recreation carrying capacity	The level of recreation use beyond which impacts exceed social or biological levels specified by evaluative standards.
recreation information management (RIM)	The Forest Service system for recording recreation facility condition and use. Technically refers to a database system that has been replaced by one called INFRASTRUCTURE.
recreation opportunity	Availability of a real choice for a user to participate in a preferred activity within a preferred setting in order to realize desired experiences.
recreation opportunity spectrum (ROS)	A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into seven classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, roaded modified, rural and urban.

primitive	Area that is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free of evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.
semi-primitive non-motorized	Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation is not permitted but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.
semi-primitive motorized	Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low but often there is evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present but would be subtle. Motorized use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted.
roaded natural	Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of people. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.
roaded modified	Area is characterized by substantially modified environments except for campsites. Roads, landings, slash and debris may be strongly dominant from within yet remain subordinate from distant sensitive roads and highways. Interaction between users and evidence of others may be moderate on roads but there is little evidence of others or interaction at camp sites. The area is managed in such a way that few on-site controls may be present except for gated roads. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.
rural	Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation or pastoral agriculture development. Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities often are provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.
urban	Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreational activities. Vegetation cover often is exotic and manicured. Sights and sounds of humans are predominant on the site. Large number of users can be expected both on the site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.
recreation residence	Cabins on National Forest System land that normally were established in tracts and built for recreation purposes with agency approval and supervision. These cabins are authorized by special-use permit and are not the primary residences of the owners.

recreation visitor day (RVD)	Twelve visit hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons. Recreation visitor days are used to measure recreational production or output capacity.
reconstruction (road)	Activity that results in improvement or realignment of an existing forest road as defined as: road improvement–activity that results in an increase of an existing road's traffic service level, expands its capacity, or changes its original design function; road realignment–activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway.
reforestation	The reestablishment of forest cover either naturally (by natural seeding, coppice, or root suckers) or artificially (by direct seeding or planting). Reforestation usually maintains the same forest type and is done promptly after the previous stand or forest was removed (synonymous with *regeneration*).
Region 2	See *Rocky Mountain Region.*
rehabilitation	Actions taken to restore or reclaim site productivity, water quality or other values.
research natural area (RNA)	Formally designated tracts of land where natural processes are allowed to continue and where natural features are preserved for education and research. These conditions are ordinarily achieved by allowing natural physical and biological processes to prevail without human intervention. However, under unusual circumstances, deliberate manipulation may be used to maintain the unique feature that the RNA was established to protect.
responsible official	The Forest Service employee who has the delegated authority to make a specific decision.
restoration	Holistic actions taken to modify an ecosystem to achieve desired, healthy, and functioning conditions and processes. Generally refers to the process of enabling the system to resume its resiliency to disturbance.
revegetation	The reestablishment and development of plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of reforestation or reseeding.
right-of-way	Land authorized to be used or occupied for the construction, operation, maintenance and termination of a project or facility passing over, upon, under or through such land.
riparian	Refers to land bordering a stream, lake or tidewater, and generally implying a particular type of habitat physiognomy often characterized by an overstory of trees or other large woody plants with a complex understory of other woody and/or herbaceous species.
riparian area	Ecological units with distinctive vegetation, landform, and soil and water regimes consisting of the aquatic ecosystem and wet-to-moist areas located between aquatic ecosystems and adjacent terrestrial ecosystems. They include floodplains and wetlands. Riparian ecosystems are distinguished by soil characteristics and distinctive existing or potential vegetation communities that are adapted to soils with consistently high levels of moisture.
riparian community	Repeating, classified, defined and recognizable assemblages of plant or animal communities associated with riparian areas.
riparian ecosystem	A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem. It is identified by soil characteristics and by distinctive vegetation communities that require free or unbounded water.

road	A motor vehicle route over 50 inches wide, unless identified and managed as a trail.
roadless area	An area in a national forest or national grassland that (1) is larger than 5,000 acres or, if smaller, contiguous to a designated wilderness or primitive area, or lies east of the 100th Meridian and therefore under the jurisdiction of the Eastern Wilderness Act; and (2) contains no roads; and (3) has been inventoried by the Forest Service for possible inclusion in the Wilderness Preservation System.
roaded modified	See *recreation opportunity spectrum.*
roaded natural	See *recreation opportunity spectrum.*
Rocky Mountain Region	The Forest Service organizational unit consisting of Colorado, Wyoming, and parts of South Dakota, Nebraska and Kansas. Also known as Region 2.
route	A road or trail that is signed and managed as a unique entity. Management can change along its length but it is singularly identified. This term is also used in GIS to denote a linear feature composed of one or more arcs or parts of arcs.
salable minerals	Salable minerals include common varieties of sand, stone, gravel, pumice, pumicite, cinders and clay. In general, these minerals are widespread and relatively low in value. They are generally used for construction materials and for road-building purposes.
scoping process	An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action. Scoping requires examining a proposed action and its possible effects; establishing the depth of environmental analysis needed; and determining analysis procedures, data needed, and task assignments. During the scoping period, the public is encouraged to participate and submit comments on proposed projects.
scenic integrity	A measure of the degree to which landscape is visually perceived to be complete. It can describe an existing situation (ESI) or desired future condition (SIO).
Scenery Management System (SMS)	A systematic approach, founded on an ecological aesthetic, for assessing visual resources in a project area and then using the assessment findings to help make management decisions on a project.
scenic byway	The National Scenic Byways program is part of the U.S. Department of Transportation, Federal Highways Administration which establishes, recognizes, and preserves selected roads throughout the United States. These roads are located in scenic or historic country.
sediment	Material that is suspended in water or air, or the deposition of such material onto the surface underlying such water or air.
sensitive species	Those plant and animal species identified by regional foresters for which population viability is a concern, as evidenced by: (a) significant current or predicted downward trends in population numbers or density, or (b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. (For a list of Region 2 sensitive species that are known or thought to occur on the White River National Forest, see appendix E of the revised forest plan).
silviculture	The art and science of controlling the establishment, growth, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.

silviculture system — A planned series of treatments for tending, harvesting, and re-establishing a stand.

site — The classification of land based on its climate, physiographic (physical geography), edaphic (soil), and biotic factors that determine its suitability and productivity for particular species and silvicultural alternatives.

size class — Tree size recognized by distinct ranges, usually of diameter or height.

ski area — A site and attendant facilities expressly developed to accommodate alpine or Nordic skiing and from which the preponderance of revenue is generated by the sale of lift tickets and fees for ski rental, skiing instruction and trail passes, or for the use of permittee-maintained ski trails. A ski area also may include ancillary facilities directly related to the operation and support of skiing activities. Operation of Nordic and alpine ski areas for up to 40 years and encompassing such acreage as the forest officer determines sufficient and appropriate is authorized by the National Ski Area Permit Act of 1986.

snowshoe hare habitat — See *lynx foraging habitat* under *lynx habitat.*

snowmobile — A motor vehicle that is designed exclusively for use over snow, with a seat that is straddled, and that runs on a track or tracks and/or a ski or skis.

social analysis — An analysis of the social (as distinct from the economic and environmental) effects of a given plan or proposal for action. Social analysis includes identification and evaluation of all pertinent desirable and undesirable consequences to all segments of society, stated in some comparable quantitative terms, such as persons or percent of population in each affected social segment. It also includes a subjective analysis of social factors not expressible in quantitative terms.

soil compaction — A physical change in soil properties that results in a decrease in porosity and an increase in soil-bulk density and strength.

soil erosion — The detachment and movement of soil from the land surface by water or wind.

soil productivity — The inherent capacity of a soil to support the growth of specified plants, plant communities or a sequence of plant communities. Soil productivity may be expressed in terms of volume or weight per unit area per year, percent plant cover, or other measures of biomass accumulation.

special-use permit — See *permit.*

species — A singular or plural term for a population or series of populations of organisms that are capable of interbreeding freely with each other but not with members of other species.

endemic: A species originating in, or belonging to, a particular region.

exotic: A species introduced accidentally or intentionally to a region beyond its natural range.

subspecies: A subdivision of a species. A population or series of populations occupying a discrete range and differing genetically from other subspecies of the same species.

species diversity — A measurement that relates the density of individuals of a species in a habitat to the number of different species present in the habitat. The number of different kinds of species in a given habitat.

special interest area — Areas managed with emphasis on protecting or enhancing unusual characteristics. These areas are managed to maintain their special interest values.

standard — In Region 2, a standard is defined as a mandatory requirement. Mandatory adherence to standards is the most important feature distinguishing standards from desired condition statements.

structural stages — Any of several developmental stages of tree stands described in terms of tree age and the extent of canopy closure they create. They include:

structural stage 1 — ***Grass/forb.*** Forest openings created by disturbances, such as fire or windthrow. Meadows and prairies are also modeled as grass/forb although succession will not move beyond this stage.

structural stage 2 — ***Shrubs/seedlings.*** Developmental stage dominated by tree seedlings (less than one-inch DBH) and shrub species.

structural stage 3 — ***Sapling/pole.*** Developmental stage dominated by young trees one to seven inches diameter breast height, 10 to 50 feet tall and usually less than 50 years old. This stage is subdivided into three canopy closure classes: (a) less than 40 percent; (b) 40 to 70 percent; and (c) greater than 70 percent.

structural stage 4 — ***Mature.*** Consists of trees larger and older than stage 3. Also classified by the same canopy closure categories as stage 3.

structural stage 5 — ***Old growth.*** This structural stage is characterized by trees at least 200 years old for spruce-fir or Douglas-fir; 150 years old for lodgepole pine; or 100 years old for aspen.

succession — The progress of vegetational development whereby an area becomes successively occupied by different plant communities.

suitable forest lands — Land to be managed for timber production on a regulated basis.

sustainability — A concept that reflects the capacity of a dynamic ecosystem to maintain its composition, function, and structure over time thus maintaining the productivity of the land and a diversity of plants and animals.

temporary road — A road authorized by contract, permit, lease, other written authorization, or emergency operation that may be associated with a timber sale contract, fire activity, or other short-term access need, and not intended to be part of the forest development transportation system and not necessary for future resource management. When intended use is ended, these roads are treated to eliminate motor vehicle traffic and permit the reestablishment of vegetation to minimize erosion with intent to return to a natural state.

thermal cover — Cover used by animals to ameliorate the effects of weather. Optimally, thermal cover is provided by a stand of coniferous trees, 30 to 60 acres in size, at least 40 feet tall, with a canopy cover of at least 70 percent.

threatened species — Any species likely to become endangered within the foreseeable future throughout all or a significant portion of its range and that has been designated in the *Federal Register* by the Secretary of the Interior as such.

tiering — The elimination of repetitive discussions of the same issue by incorporating by reference the general discussion in an environmental impact statement of broader scope (e.g., a project environmental assessment could be tiered to the forest plan EIS).

timber — A general term applied to tree stands that provide a wood-fiber product.

timber base	The lands within a national forest suitable for timber production.
timber production	The purposeful growing, tending, harvesting and regeneration of regulated crops of trees to be cut into logs, bolts or other round sections for industrial or consumer use, except fuelwood.
traditional	The beliefs, acts, practices, objects, or sites for the perpetuation of an Indian culture originating from or historically located at a specific area. This may include traditional cultural practices that are so interrelated with spiritual activities that they cannot be separated from the land location.
trail	A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail.
trailhead	The parking area, signage, or other facilities available at the beginning of a trail.
trail vehicle	Vehicles designed for trail use, such as bicycles, snowmobiles, trail motorcycles, and all-terrain vehicles (ATVs).
travel management	The integrated planning of and provision for appropriate movement of people and products to and through National Forest System lands.
travel management strategy	A designation of acceptable modes, methods and time periods for travel over a road, trail, or area.
travel order	A travel management decision issued by the Regional Forester or Forest Supervisor to restrict, prohibit or allow the use of a described area or transportation facility over which the Forest Service has jurisdiction.
travelway	A way for passage of vehicles, conveyances, persons or domestic livestock (stock driveways), developed by construction or use; may be referred to as a road or a trail.
treaty	A legally binding agreement between two or more sovereign governments. With respect to American Indian tribes, a treaty is a document negotiated and concluded by a representative of the president of the U.S. and ratified by two-thirds majority vote of the U.S. Senate.
tribe	Term used to designate a federally recognized group of American Indians and their governing body. Tribes may comprise more than one band.
unauthorized roads or trails	Roads or trails on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a road or trail; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization. Synonyms: *non-system road, non-system trail, user-created and way.*
understory	The lowest layer of vegetation in a forest or shrub community composed of grass, forbs, shrubs and trees less than 10 feet tall. Vegetation growing under the tree canopy.
undesirable species	(1) Species that conflict with or do not contribute to the management objectives; (2) species that are not readily eaten by animals.

unsuitable forest land (not suited)	Forest land not managed for timber production because: (a) Congress, the Secretary, or the Chief has withdrawn it; (b) it is not producing or capable of producing crops of industrial wood; (c) technology is not available to prevent irreversible damage to soil productivity, or watershed conditions; (d) there is no reasonable assurance based on existing technology and knowledge, that it is possible to restock lands within 5 years after final harvest, as reflected in current research and experience; (e) there is, at present, a lack of adequate information about responses to timber management activities; or (f) timber management is inconsistent with or not cost-efficient in meeting the management requirements and multiple-use objectives specified in the forest plan.
urban	See *recreation opportunity spectrum.*
utility corridor	A linear strip of land defined for the present or future location of transportation or utility facilities within its boundaries
vegetation management	Any activities undertaken to modify the existing condition of the vegetation.
viable population	A group of individuals of a particular species that produces enough offspring for long-term persistence and adaptation of the species or population in a given place.
viewshed	Total visible area from a single observer's position or the total visible area from multiple observer positions. Viewsheds are accumulated seen areas from highways, trails, campgrounds, towns, cities, or other view locations. Examples are corridors, feature or basin viewsheds.
water influence zone	The land next to water bodies where vegetation plays a major role in sustaining long-term integrity of aquatic systems. It includes the geomorphic floodplain, riparian ecosystem, and inner gorge. Its minimum horizontal width (from top of each bank) is 100 feet or the mean height of mature dominant late-seral vegetation, whichever is most.
watershed	An area of land that collects and discharges water into a single main stream through a series of smaller tributaries. The area of land, bounded by a divide, that drains water, sediment and dissolved materials to a common outlet at some point along a stream channel, or to a lake, reservoir or other body of water. Also called drainage basin or catchment.
watershed level	Divides watersheds into a series of progressively smaller nested levels, with the first level being the largest land area relative to higher-numbered levels in that watershed. Each level is identified systematically by a hydrologic unit code number, or HUC. A first-level watershed can be divided into a number of second level watersheds; each second-level watershed may be further subdivided into third-level watersheds; and so forth.
water yield	(1) The measured output of surface water, usually measured in acre-feet; (2) the runoff from a watershed, including groundwater outflow.
way	See *unauthorized road or trail..*
wild, scenic and recreational rivers	Rivers or sections of rivers designated by congressional actions under the 1968 Wild and Scenic Rivers Act as wild, scenic, or recreational by an act of the legislature of the state or states through which they flow. See also *National Wild and Scenic Rivers System.* Rivers may be classified and administered under one or more of the following categories:

wild river	River or section of river that is free of impoundments with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
scenic river	River or section of river that is free of impoundments, with watersheds still largely undeveloped, but accessible in places by roads.
recreational river	River or section of river that is readily accessible by road or railroad that may have some development along its shoreline and that may have undergone some impoundment or diversion in the past.
wilderness	An area of undeveloped federal land that Congress designated as wilderness and that retains its primeval character and influence, without permanent improvements or human habitation, and that is protected and managed to preserve its natural conditions. An area that: (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; 3) comprises at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unimpaired condition; and 4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.
wildfire	Any wildland fire not designated and managed as a prescribed fire within an approved prescription. All wildfires will be given an appropriate suppression action.
wildlife	Collectively, non-domesticated vertebrate animals, except fishes. The natural community of animals and plants.

APPENDIX E: RELEVANT FEDERAL AND STATE STATUTES AND OTHER REGULATIONS

All statutes, regulations, laws, executive orders, Forest Service directives, and the forest plan—current or future—are also hereby incorporated into the travel management plan. The following list includes statutes, regulations, laws, executive orders, and agreements relative to the travel management plan. The travel management plan will be modified if necessary to incorporate any new or revised statutes, regulations, laws, executive orders, or Forest Service directives. The travel management plan will also be modified if necessary to reflect any changes to the forest plan.

Statutes

American Indian Religious Freedom	*Act of August 11, 1978*
Americans with Disabilities Act	*Act of 1990*
Anderson-Mansfield Reforestation and Revegetation	*Act of October 11, 1949*
Antiquities Act	*Act of June 8, 1906*
Archaeological Resources Protection Act, as amended 1988	*Act of October 31, 1979*
Architectural Barriers Act	*Act of 1968*
Bankhead-Jones Farm Tenant Act	*Act of July 22, 1937*
Clarke-McNary Act	*Act of June 7, 1924*
Clean Air Act Amendments of 1977 and 1990	*Act of August 7, 1977*
Clean Water Acts (1948-87)	
Clean Water Amendments (“Federal Water Pollution Control Act Amendments of 1972”)	
Color of Title	*Act of December 22, 1928*
Common Varieties of Mineral Materials	*Act of July 31, 1947*
Cooperative Forestry Assistance Act	*Act of July 1, 1978*
Disaster Relief Act	*Act of May 22, 1974*
Eastern Wilderness Act	*Act of January 3, 1975*
Economy Act	*Act of June 30, 1932*
Emergency Flood Prevention (Agricultural Credit Act)	*Act of August 4, 1978*
Endangered Species Act	*Act of December 28, 1973*
Energy Security Act	*Act of June 30, 1980*
Federal Advisory Committee Act	*Act of October 6, 1972*
Federal Cave Resources Protection Act	*Act of November 18, 1988*
Federal Coal Leasing Amendments Act	*Act of August 4, 1976*
Federal Insecticide, Rodenticide, and Fungicide Act	*Act of October 21, 1972*
Federal Land Policy and Management Act	*Act of October 21, 1976*
Federal Noxious Weed Act	*Act of January 3, 1975*
Federal Power Act	*Act of June 10, 1920*
Federal-State Cooperation for Soil Conservation	*Act of December 22, 1944*

Federal Water Pollution Control Act, as amended (Water Quality Act of 1965, Clean Water Restoration Act of 1966)	*Act of July 9, 1956*
Federal Water Project Recreation Act	*Act of July 9, 1965*
Fish and Wildlife Conservation	*Act of September 15, 1960*
Fish and Wildlife Coordination Act	*Act of March 10, 1934*
Forest and Rangeland Renewable Resources Planning Act	*Act of August 17, 1974*
Forest Highways	*Act of August 27, 1958*
Freedom of Information Act	*Act of November 21, 1974*
Geothermal Steam Act	*Act of December 24, 1970*
Granger-Thye Act	*Act of April 24, 1950*
Historic Preservation Act	*Act of October 15, 1966*
Joint Surveys of Watershed Areas Act	*Act of September 5, 1962*
Knutson-Vandenberg Act	*Act of June 9, 1930*
Land Acquisition	*Act of March 3, 1925*
Land Acquisition-Declaration of Taking	*Act of February 26, 1931*
Land Acquisition-Title Adjustment	*Act of July 8, 1943*
Land and Water Conservation Fund Act	*Act of September 3, 1964*
Law Enforcement Authority	*Act of March 3, 1905*
Leases Around Reservoirs	*Act of March 3, 1962*
Mineral Leasing Act	*Act of February 25, 1920*
Mineral Leasing Act for Acquired Lands	*Act of August 7, 1947*
Mineral Resources on Weeks Law Lands	*Act of March 4, 1917*
Mineral Springs Leasing	*Act of February 28, 1899*
Mining and Minerals Policy Act of 1970	*Act of December 31, 1970*
Mining Claims Rights Restoration Act	*Act of August 11, 1955*
Multiple Use and Sustained Yield Act	*Act of June 12, 1960*
National Environmental Policy Act	*Act of January 1, 1970*
National Forest Management Act	*Act of October 22, 1976*
National Forest Roads and Trails Act	*Act of October 13, 1964*
National Historic Preservation Act	*Act of October 15, 1966*
National Historic Preservation Act Amendments of 1980 and 1992	*Act of December 12, 1980*
National Trails System Act	*Act of October 2, 1968*
Occupancy Permits	*Act of March 4, 1915*
Organic Administration Act	*Act of June 4, 1897*
Petrified Wood	*Act of September 28, 1962*
Pipelines	*Act of February 25, 1920*
Preservation of American Antiquities	*Act of June 8, 1906*
Preservation of Historical and Archaeological Data	*Act of May 24, 1974*
Public Land Surveys	*Act of March 3, 1899*
Public Rangelands Improvement Act	*Act of October 25, 1978*
Rehabilitation Act of 1973, as amended	*Act of 1973*
Renewable Resources Extension Act	*Act of June 30, 1978*
Research Grants	*Act of September 6, 1958*
Right of Eminent Domain	*Act of August 1, 1888*
Rural Development Act	*Act of August 30, 1972*

Safe Drinking Water Amendments	*Act of November 16, 1977*
Sikes Act	*Act of October 18, 1974*
Small Tracts Act	*Act of January 22, 1983*
Smokey Bear Act	*Act of May 23, 1952*
Soil and Water Resources Conservation Act	*Act of November 18, 1977*
Solid Waste Disposal (Resource Conservation & Recovery Act)	*Act of October 21, 1976*
Supplemental National Forest Reforestation Fund	*Act of September 18, 1972*
Surface Mining Control And Reclamation Act	*Act of August 3, 1977*
Sustained Yield Forest Management	*Act of March 29, 1944*
Timber Export	*Act of March 4, 1917*
Timber Exportation	*Act of April 12, 1926*
Title Adjustment	*Act of April 28, 1930*
Toxic Substances Control Act	*Act of October 11, 1976*
Transfer Act	*Act of February 1, 1905*
Twenty-Five Percent Fund	*Act of May 23, 1908*
Uniform Federal Accessibility Standards U.S. Criminal Code (Title 18 USC Chapter 91 – Public Lands)	*Act of June 25, 1948*
U.S. Mining Laws (Public Domain Lands)	*Act of May 10, 1872*
Volunteers in the National Forests Act	*Act of May 18, 1972*
Water Quality Improvement Act	*Act of April 3, 1965*
Water Resources Planning Act	*Act of July 22, 1965*
Watershed Protection and Flood Prevention Act	*Act of August 4, 1954*
Weeks Act	*Act of March 1, 1911*
Weeks Act Status for Certain Lands	*Act of September 2, 1958*
Wild and Scenic Rivers Act	*Act of October 2, 1968*
Wild Horse Protection	*Act of September 8, 1959*
Wild Horses and Burros Protection Act	*Act of December 15, 1971*
Wilderness Act	*Act of September 3, 1964*
Wildlife Game Refuges	*Act of August 11, 1916*
Wood Residue Utilization Act	*Act of December 19, 1980*
Woodsy Owl/Smokey Bear Act	*Act of June 22, 1974*
Youth Conservation Corps	*Act of August 13, 1970*

Regulations

36 CFR 60	National Register of Historic Places
36 CFR 212	Forest Development Transportation System
36 CFR 213	Administration Under Bank-Jones Act
36 CFR 219	Planning
36 CFR 221	Timber Management Planning
36 CFR 222	Range Management
36 CFR 223	Sale and Disposal of National Forest System Timber
36 CFR 228	Minerals
36 CFR 241	Fish and Wildlife
36 CFR 251	Land Uses
36 CFR 254	Landownership Adjustments

36 CFR 261	Prohibitions
36 CFR 291	Occupancy and Use of Developed Sites and Areas of Concentrated Public Use
36 CFR 292	National Recreation Areas
36 CFR 293 s	Wilderness Primitive Area
36 CFR 294	Special Areas
36 CFR 296	Protection of Archaeological Resources
36 CFR 297	Wild and Scenic Rivers
36 CFR 800	Advisory Council on Historic Preservation
40 CFR 1500–1508	Council on Environmental Quality
National Electrical Code	
National Fire Code	
Uniform Building Code	
Uniform Mechanical Code	
Uniform Plumbing Code	

Executive Orders

EO 11593	Protection and Enhancement of Cultural Environment
EO 11988	Floodplain Management
EO 11644/11989	Use of Off-Road Vehicles
EO 11990	Protection of Wetlands
EO 12113	Independent Water Project Review
EO 12898	Environmental Justice
EO 13007	Indian Sacred Sites

State and Local Laws

Colorado Air Quality Control Act

Forest Service Directives

Forest Service Manual (FSM) contains legal authorities, goals, objectives, policies, responsibilities, instructions, and guidance needed on a continuing basis by Forest Service line officers and primary staff, in more than one unit, to plan and execute assigned programs and activities.

Forest Service Handbooks (FSH) are directives that provide instructions and guidance on how to proceed with a specialized phase of a program or activity. Handbooks are either based on a part of the FSM or they incorporate external directives.

Agreements

Memorandum of Understanding

Federal Highway Administration (FHWA) and Forest Service

- Forest Service Roads subject to the Highway Safety Act–1976, 1982

State of Colorado and Forest Service, National Park Service, and Bureau of Land Management

- Travel Management Signs for Public Lands in Colorado–September 30, 2002

Colorado Senate Bill 94-217 (1994)

- Requires state Air Pollution Control Division to periodically evaluate federal actions and their impacts to visibility and other air-quality-related values in Class I areas.

Federal Multi-Agency Source Water Agreement

- Thirteen federal agencies, including the Forest Service, agreed to assist states and local entities, within the mission and resources of the agency, to complete local source water assessments and protection activities.

APPENDIX F: LITERATURE CITED AND OTHER REFERENCES

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